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OFFICIAL JOURNAL OF THE CLEMSON TEXTILE SCHOOL

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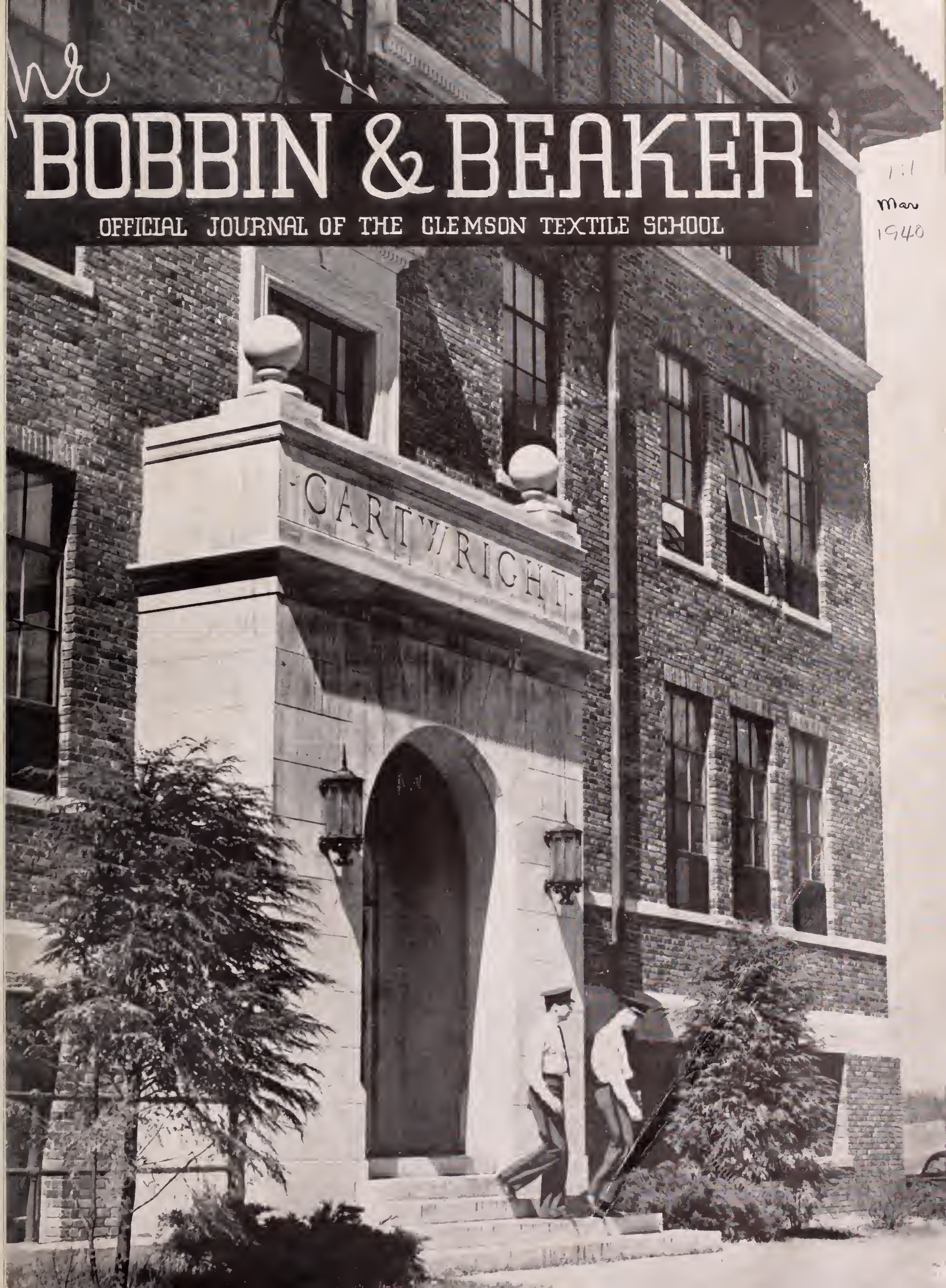

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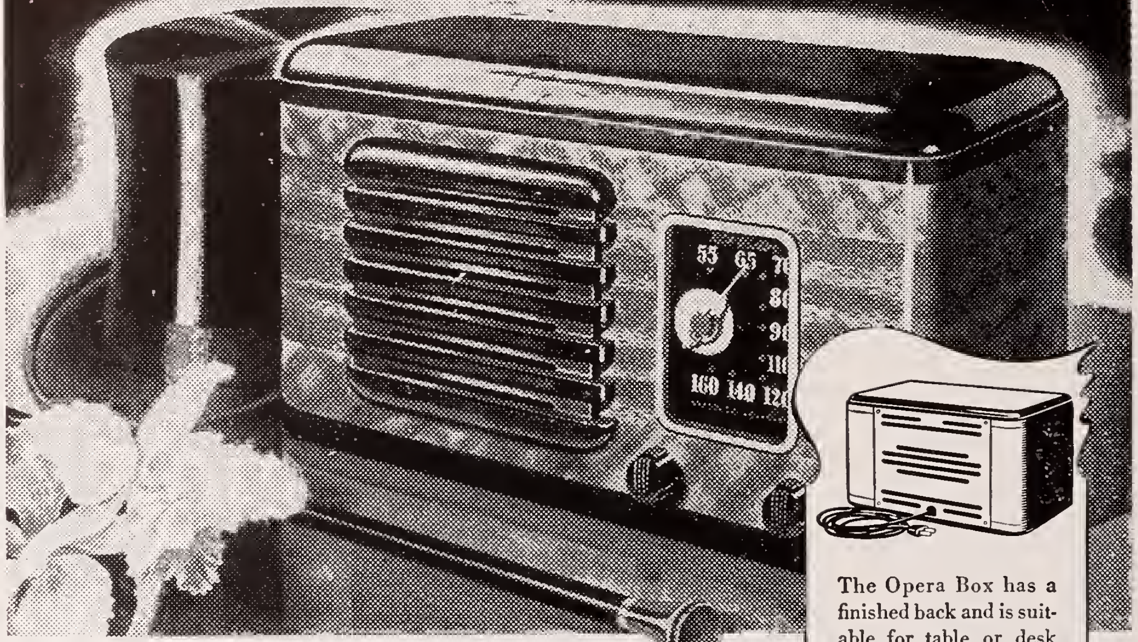

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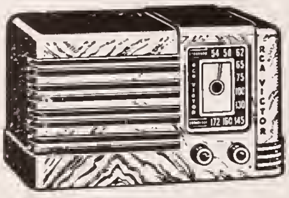

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The
Bobbin and Beaker

Official Textile Student Publication of Clemson A. & M. College

VOLUME I MARCH, 1940 NUMBER I

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A Future In Textiles

GUEST EDITORIAL *By* WM. P. JACOBS, PRESIDENT PRESBYTERIAN COLLEGE

One of the most serious fallacies in modern life is the thought of the young man that all of the lands have been conquered, that the day of the pioneers has passed, that the door is closed to initiative. As a matter of fact, the door is wide open. There is a great future in most industries.

Textile engineers tell us that we are still facing the process of liquidation in the textile industry. Fortunately for us, most of our mills in the South are pretty well modernized and are capable of meeting the test of a long pull through narrow margin periods. Large profits are probably a thing of the past in the textile industry. But research in processes and machinery has fitted our mills to meet severe competition, to produce goods at lower proportionate costs, and to weather the storms. But even in an industry that is over-manned there is a future for the youth of the land.

WILLIAM P. JACOBS

I believe that college graduates have usually found an opening in the industry, and I predict that they will continue to find such an opening, and if they have ability in the field of engineering, research or production, they will rise, no matter how severe the competition. Who knows but that a Clemson graduate will unearth discoveries that will revolutionize the textile field? There are opportunities for initiative, but initiatve, self-determination, the will to succeed are absolutely essential to success in the textile industry or in any other industry.

It is my belief that the process of production in the textile industry has made much more rapid strides than other phases of textile work; that science has served the producer better than it has the seller. It is my belief that in the field of merchandising there is a greater opportunity for the young textile graduate than in any other field.

We need new textile salesmen, not only salesmen that can take a given product and sell it smartly, but salesmen who can style the product; who can make it more adaptable to the market; salesmen who can advise in general merchandising policies; and what is more than that, salesmen who can build a new market for textiles. No one knows whether we are making too many cotton goods today or not. No one can foretell the future, but it is safe to say that any man who specializes in the study of the merchandising angle of textiles, any man who goes out and develops new fields for textiles, will be performing a constructive service for the industry, and will find his profits more quickly.

For instance, we need in South Carolina several hundred more small fabricating units to take the textile products which are made in this state, finish them or have them finished, and make them into the articles for wearing apparel or other use. While plants have been growing up all around us, South Carolina has not kept pace with this development. There are millions of dollars of South Carolina capital in hiding or invested in other industries elsewhere, which might just as well be brought back home, if the enterprising, dependable, ambitious young men can be found in this state who know enough about the essentials of textiles and have enough confidence in their ability to launch out into the field of textile fabricat-

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College Graduates In The Textile Industry

AS TOLD TO THE AUTHOR BY BROWN BAHAN

By W. W. FOSTER

For the technically trained man the field of textiles is virtually wide open. There are opportunities everywhere for the man with the training and ability and energy. The field of textiles has so many different types of jobs that it would be difficult to enumerate them. The possibilities for a man in this field are limitless. There are so many different directions that he could take that it is impossible to predict just how far one could go. It is possible to reach the top in one phase of the textile industry then step over in another part of the field and be just at the beginning.

The number of technically trained men per capita in the textile industry is very small. Textile schools as compared with schools training men for other industries are indeed a very small minority. The number of college trained men in the textile industry who have jobs as departmental foremen and even plant superintendents is relatively small. It is true that the Textile Schools are turning out men every year but the industry is so large that these men are immediately absorbed and the demand for college trained men is still open.

The textile industry today cannot get along without trained experts. Foreign manufacturers and the great volume of the industry in our own country has placed the textile industry on a highly competitive plane. New machinery is not demanding more work from the laborers but more skill and only men thoroughly trained can efficiently employ and direct the great mass of labor in the industry. In the last decade only has the textile industry felt the effect of efficiency experts and cost engineers. But the industry as a whole is untouched by these aids. If the textile industry of the United States is to maintain its standard of high wage payment it is through the medium of more efficient organization, superior machinery, and a high quality product. Many mills today operate under a high overhead because they simply have not awakened to the fact that their methods are obsolete as well as their machinery. Such positions as job analysis and efficiency experts are open only to college trained men and this phase of the textile industry is just now beginning to grow. The opportunity is there, all one needs to do is knock.

A college man trained in textiles is well suited for an executive's job in the industry. He has a thorough working knowledge of the industry, he actually knows and understands the machinery and yet his education is broad enough to enable him to step right into the executive field. For a college man who has a chance to get into the executive field nothing will help as much as some practical experience. While he is getting this practical experience he will learn a great deal about that most vital element of any industry—the human element. This will prove of inestimable value to him when he begins to act in an executive capacity. On the other hand a man only trained in business administration or some other type of business which failed to equip him with the fundamental knowledge of the textile industry would be at a disadvantage as an executive in the textile field because he would not understand the actual production problems of the industry. His greatest disadvantage would be that he would have no practical experience and would not have a thorough understanding of the workers in the industry.

Theoretical training in any industry is not enough. One may know everything that has ever been printed about a subject but unless he is able to apply what he knows his training has been useless. Theoretical training is vitally necessary but unless it is backed by practical experience it is virtually worthless. Practical experience on top of technical training is an advantage that cannot be overcome by either of the two by themselves. The only way to know a particular machine is to actually work with it. A man is really just beginning to study when he graduates from college. Every day something new is brought out and the only way to learn about it is by studying. College is supposed to teach you how to study, to separate the grain from the chaff. It is this quality that gives the trained man an advantage over the untrained man.

Getting the right start is the essence of success in any business. Don't get licked before you

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Artificial Fibers In The Spotlight

By E. R. ROPER

Rayon and synthetic fibers are here today and are here to stay. This new decade, beginning with 1940 marks the fourth stage of its growth. The first stage, from 1912 to 1919, in which the industry was new experienced the education of the public to these products, and the overcoming of technical difficulties. The second stage, from 1920 to 1929, in which production was increased rapidly, introduced the acetate and cuprammonium processes to this country, and the consumer realized that products with desirable properties of their own had definitely established themselves as textile fibers. In the third stage, from 1930 to 1939, production levelled off and new yarn qualities were developed such as pigmented yarns, multifilament yarns, and cut staple fiber. The fourth stage is beginning. Other manufactured yarns are making their appearance. The Italians have developed an artificial wool made from casein named "Lanital." Du Pont has developed a mineral fiber called "Nylon." The role that artificial fibers will play now that the European war has limited imports is another factor that this decade makes potent.

Will production in the U. S. be increased? Will the demand for cellulose be met by the wood pulp industry? If so, the South will be immediately affected because the wood pulp industry is moving south so that it might have access to the low cost, rapid growing short leaf pine that may be converted into pulp.

Rayon filament was first produced abroad in 1890, the pioneering countries being Belgium, France, Germany, and Great Britain. However, in 1911, the U. S. became the largest producer of rayon filament and has remained so except for one year, 1937, when it was outranked by Japan. U. S. per cent of world production has risen steadily from 7 per cent in 1913 to 28 per cent in 1938. In 1920, Great Britain was the second largest producer with 18 per cent, followed by Germany with 16 per cent. In that year Japan produced only 1 per cent of the world's supply. Both Great Britain's and Germany's percent of world production has decreased, giving away to Japan. This nation has risen from the lowest producer in 1920 to the second largest producer in 1938.

Two years ago, the total production of rayon filament was 990,245,000 pounds of which the U. S. consumed 274,062,000 pounds or 27.7 per cent of the world's total of which only 262,000 pounds were imported. It would seem that the U. S. is the largest producer of rayon, and at the same time practically self sufficient.

The average price of rayon filament has shown a steady decrease since 1911. That year, U. S. 150 denier viscose yarn sold for $1.85 per pound. On July 29, 1938, the same yarn sold for $0.51 per pound. The highest prices were from 1914 through 1920 when the price rose from $2.00 to $6.00 per pound. After the World War, the price became steady and continued to decline due to larger consumption and cheaper production.

The problems that confronted Rayon, or artificial silk of a cellulose base, have not only been technical ones, but also economical ones. At first, and particularly in England where rayon was used as an adulterant of wool, prohibitive tariffs hampered its development. The public had to be educated to the new fiber. Formerly rayon was considered an artificial silk, a fiber that would duplicate and perhaps replace silk. To correct this view the National Retail Dry Goods Associations appointed a committee to select a new name that would exclude the word silk. The name "Rayon" was proposed and adopted unanimously.

The processors handled rayon with cotton machinery where such could be used. In fact, it has not been until recently that machinery for rayon and rayon only has been developed. Such machines include twisters, warpers, silk looms, and stainless steel finishing equipment. Rayon, although of the same chemical nature as cotton, possesses properties remarkably different from cotton. Excessive friction frays it, high temperatures play havoc in slashing, and the effect of too much tension might not make itself evident until the goods are woven. Particularly delicate is acetate rayon.

The finishers have their headaches too. The regenerated rayons, Viscose, and Cuprammonium possess properties similar to cotton, but for acetate, a cellulose ester, entirely new dyes have had to be perfected. One might wonder why such a finicky fiber as acetate might survive. Acetate possesses qualities infinitely different from the other

(Continued on page 14)

Importance of The Clemson Textile School

THE TEXTILE SCHOOL'S AND INDUSTRY'S INDEPENDENCE UPON EACH OTHER

By PROF. R. K. EATON

The subject assumes that the Clemson College Textile School is now important in the educational and industrial system of the state. Some of you may know that the Faculty of the Textile School cooperate with the mills of the state in every possible way; at times we are able to make tests for them, which can not be successfully carried out in the mills. Our most frequent service is check testing—that is, the mills make their routine tests and then the same tests are checked at the school under controlled conditions. Another service rendered the mills is furnishing trained young men. While we do not maintain an employment bureau, we do keep records of our graduates and try to help them advance in manufacturing and at the same time send to the mills young men who will be useful in their organizations.

There are many South Carolina families who believe that we have rendered good service, for they are sending their sons to us in increasing numbers each year. The Textile School appreciates that faith and tries in every way to continue to deserve it.—We are preparing our students to enter into the second largest industry in the state. Of course, agriculture will always be our largest industry and Clemson College will always be the fountain head for all scientific agricultural information and research.

Since I have mentioned agriculture, it might be well at this point to tell you that there is no animosity between the cotton manufacturer and the cotton farmer. After reading the newspapers recently you may have formed the opinion that manufacturers are fighting against the cotton farmers. Nothing could be further from the facts. Textile manufacturers desire the cotton farmer to be prosperous. They have encouraged the Clemson Agricultural Extension and County Agent Services and have backed cotton farming experiments. Not so very long ago cotton manufacturers were the people who offered the cash prizes which were paid to cotton farmers for outstanding accomplishments. Their interest encouraged the farmers to improve their staple, and as a result South Carolina now raises cotton more than 50 per cent of which demands a premium price.—More important is the fact that South Carolina cotton can be converted locally. Not so many years ago our mills were importing cotton from the west.

AT WORK IN DYEING LAB

When the mills were built in South Carolina, they were equipped just as were all other mills in the world, and for thirty or forty years all the cotton mills of the country have used the same type of machinery and approximately the same number of operatives per pound of product. This was modified by various state laws.—A few years ago it occurred to some smart manufacturer that there might be a better way of utilizing his machinery and operatives; since that day all manufacturers have been studying, planning, and experimenting. Of course, some of the experimenting with the operatives has resulted in some unfortunate strikes, but on the whole, textile workers are being benefited rapidly and steadily. There will be fewer workers necessary, but those who do work in the mills will be high wage earners. This change will be accomplished by the use of improved machinery which is now being offered for sale to the mills.

(Continued on page 15)

Facts About Rayon

By R. C. FORRESTER AND J. M. HEAPE

Rayon, a relatively new textile fiber, has made great strides in the past few years. Chardonnet, now widely acclaimed as the "Father of the Rayon Industry," secured his first French patent on Rayon in 1884. Since Chardonnet's time, many famous scientists have devoted their lives to the development of Rayon, and therefore the perfection of this fiber cannot be attributed to any one man. The first American Companies were founded about 1900, but they began to operate successfully only after having overcome great financial difficulties.

Previously in this article, the fiber has been called rayon, but its original name was "artificial silk." The manufacture of "artificial silk" caused such a decrease in the consumption of real silk that the importers of real silk urged that another name be given to the new fiber. The National Retail Dry Goods Association then changed the name from "artificial silk" to "Rayon." The changing of its name gave this new fiber much publicity and helped its growth tremendously.

In 1911 the production of rayon was only 365,000 pounds, but by 1925 it had jumped to 36,330,000 pounds. The production for 1940 is predicted to be about 400,000,000 pounds, which shows that the growth of this fiber has been sensational. In America there are 29 rayon plants, which are owned by 18 firms. These plants employ 57,000 persons and pay them 65 million dollars in wages annually. Due to the mass production of this fiber, it seemed as though there would be a surplus, which would be detrimental to the selling price. As a matter of fact, our American companies are unable to supply the demand, and during 1937 they were compelled to import 35 million pounds of rayon to fill their orders. According to reports, the manufacturers, even with increased production, are going to be hard pressed to supply the 1940 demand.

Although the trend in the consumption of rayon has been upward in the last 20 years, this does not mean that natural fibers such as cotton and wool have decreased. Rayon has been a supplement to these fibers rather than a substitute for them. The production of cotton goods has not decreased to any great extent since rayon has made its appearance on the textile market. In fact, the introduction of rayon into the cotton mills has saved many a mill from failing when the sale of cotton goods was poor or when the price didn't warrant the cotton manufacturer's selling his goods.

It is not uncommon today to find cotton mills spinning and weaving rayon with cotton. The use of rayon in this fashion hasn't been harmful in the least to the mills but has introduced possibilities for making new fabrics. Rayon (staple) is very adaptable to cotton machinery and can be processed in the same manner as cotton with only a few small changes in the settings of the machines. The mills have been quick to see the advantage of using this new fiber in conjunction with cotton, and now one-half of all the textile mills in the U. S. A. weave rayon, very often in combination with other fibers. It is estimated that 3 additional cotton mills begin using rayon every month. Woolen mills, reluctant at first, have also become "rayon minded," and they are now using a wool and rayon mix.

Germany, Japan, and other totalitarian states compel their textile manufacturers to weave a certain per centage of rayon into all the cloth that is produced. In America, however, rayon has climbed to its position as an important textile fiber the hard way, by strict competition, new styles, wear and price values. The women of this country constitute the majority of the rayon purchasers, and due to its rapid growth, it is quite evident that rayon has met with their approval.

The American producers do not take the attitude that rayon has reached a point of perfection, and they are continually striving to make a better fiber. Every large rayon corporation has chemists working to increase the elasticity, tensile strength, and other qualities of rayon. Each company vies with the others in perfecting a new and superior rayon. With the vast consumption of rayon today and the untiring efforts to make it even better, the future of this fiber, indeed, seems unlimited.

The National Rayon Weavers' Association was chartered early in 1933.

Names In Stone

Names Not Only Engraved in Stone But in the Hearts of Mankind

By C. E. Anderson

The cornerstone of Clemson's new Textile Building was laid in the early Spring of 1938. A spirit of reverence and homage pervaded the ceremony, a spirit engendered by the contributions to civilization of four great men in the history of textiles. These men, Arkwright, Cartwright, Whitney and Perkins, left a permanent imprint on not only the textile industry but also on the welfare of mankind as a whole.

Today the Textile Building stands as a lasting symbol of progress and as an appropriate memorial to four men whose achievements made such progress possible. Their names, engraved in large granite blocks, surmount the different entrances to the building, occupying there a key position just as did their accomplishments in the growth of the textile industry.

The name of Edmund Cartwright appears over the west wing entrance which is appropriately shown on the cover piece. He was born in Nottinghamshire, England in the year 1743 and was graduated from Oxford College at the age of 21. His succeeding inventions were more numerous than profitable, their purpose being to increase production of woven fabrics by increasing the number of machines. To Edmund Cartwright we owe the inception of the power loom and, for this, we honor his name.

The entrance to the east wing bears the name of Sir Richard Arkwright who rose from the most humble environment to become a famous inventor, industrialist and finally to have the title of Knight conferred on him by King George. His education was of the most meager sort and his early profession was that of barber. Soon, however, his interests and efforts turned to the spinning process. This diversion of occupation bred another forward step in the textile industry, that of the spinning frame. For this invention the world does and always will honor Sir Richard Arkwright.

The Textile Building Under Construction

Also on the east wing is inscribed the name of Eli Whitney, born on a Connecticut farm and endowed with great mechanical ability which he exercised to defray expenses at Yale University. Upon his graduation in 1792, he was determined to teach school, but his aim was thwarted by a sudden interest in the problem of separating cotton fibers from the seed. After only several weeks the world witnessed the advent of Eli Whitney's cotton gin. This machine made possible a supply of raw material to meet production demands. For this achievement we do him honor.

A stone bearing the name of Sir William Henry Perkins is placed in the west wing of the building. This man, generally known as the father of the coal tar color industry, was born in 1838 and received his education in the City of London School and the Royal Academy of Chemistry. His ability was soon recognized by professors and he was encouraged in his research. While attempting to produce a synthetic quinine, he discovered a chemical compound which became known as analine blue or mauve. This discovery has since been of vital importance to the textile industry by making its products attractive and more saleable. For this, we honor Sir William Henry Perkins.

Four names on four gray stones seem a small tribute to such great men, but every textile process from the raw material through the dye room revitalizes and enhances the memory of their deeds and instills more deeply within us the realization of our indebtedness to them.

Rayon filament yarn was first commercially producing 990 million pounds of rayon filament output of rayon yarn amounted to only 30,000 pounds. In 1938 there were twenty-two countries producing 990 million pounds of rayon filament yarn.

Nylon

MORE ABOUT THE NEW SYNTHETIC FIBER

By P. J. BURNS

For many years research by highly trained chemists and engineers has been among the major activities of the Du Pont Company. This has resulted in new products, an improving of the quality of products, a lowering of production costs, and the simplification and standardization of operations. The most recent result of this research is the development of Nylon, a synthetic fiber.

Nylon is derived from air and water, coal, or other substances. As far as can be determined, the textile fiber made from Nylon is the first man-made organic fiber prepared wholly of raw materials from the mineral kingdom. Other textile fibers in general use, including wool, linen, silk, rayon, and cotton are derived from animal or vegetable materials.

Nylon is characterized by the extreme strength and toughness and the peculiar property to be formed into fibers and into various shapes, such as sheets and bristles.

There are many potential uses of nylon, but one of the most promising of these is in the manufacture of fine hosiery. Other likely uses for this material in yarn form are knit goods of different kinds, bathing suits, underwear, woven dress goods, bead cord, pile fabric, upholstery, and draperies. The nylon fiber is already being used in the manufacturing of sewing thread and fishing lines.

A heavy single-filament form is being produced for conversion into such diversified products as fishing leaders, brush bristles, and surgical sutures. Aside from the filament form, nylon in the flake form is extruded on copper wire for the purpose of insulation. Still other formations of nylon yet in the laboratory stage may soon become important contributions in the field of transparent sheetings, plastics, and finishes.

When extensive manufacturing is begun, nylon hosiery will be made by a number of the nationally known hosiery manufacturers. Present indications are that this hosiery will be on the market by the late spring or early summer of this year. One of the assets of nylon stockings is the holding of their shape. When properly fitted, these stockings will not stretch or bag in the knees. Due to the high degree of elasticity of the yarn, the hose retain their original shape after stretching. Experimentally, nylon fibers have deminstrated greater strength elasticity factors than any fibers now in use.

One of the largest uses of nylon at the present time is the bristles in Dr. West's "Miracle Tuft" toothbrush. These bristles are stronger and more elastic than pig bristles, more uniform in size, have a better color initially, hold their color longer, last longer, and absorb less water, therefore, they do not become soft and flabby.

There has been little commercial production of any nylon products because of the lack of available nylon. In 1938 a pilot plant was put into operation to produce limited quantities of nylon for experimental purposes. Some of the yarn from this plant has been sent to manufacturers of hosiery interested in the possible commercial production of nylon hosiery, so that they may become familiarized with the nylon qualities.

A plant for the manufacturing of nylon was recently completed at Seaford, Delaware. The entire building is air-conditioned, and is extremely neat and in order. The building is a single-story rectangular structure, 1052 feet long and 272 feet wide. The manufacturing process begins at one end of the building. The following processes are carried out in "rooms" formed by walls running the width of the building. When this plant is in complete operation, about 850 workers will be employed to produce approximately four million pounds of nylon yarn a year.

These four million pounds of nylon yearly will not immediately take over the silk market which last year employed 45,000,000 pounds of silk, but if nylon consumption increases as rapidly as did rayon, the Japanese, from whom we buy four-fifths of our silk, have a reason for grave concern.

DuPont announced in October that its new, first all-chemical yarn, will be known as "Nylon." A ten million dollar plant was contemplated at Seaford, Del., which will require at least twelve months to bring the new "Nylon" yarn into production.

Something About Our Faculty

REPORTS ON WORKS AND RESEARCH IN TEXTILES BY PROFESSORS

By C. M. ZEIGLER

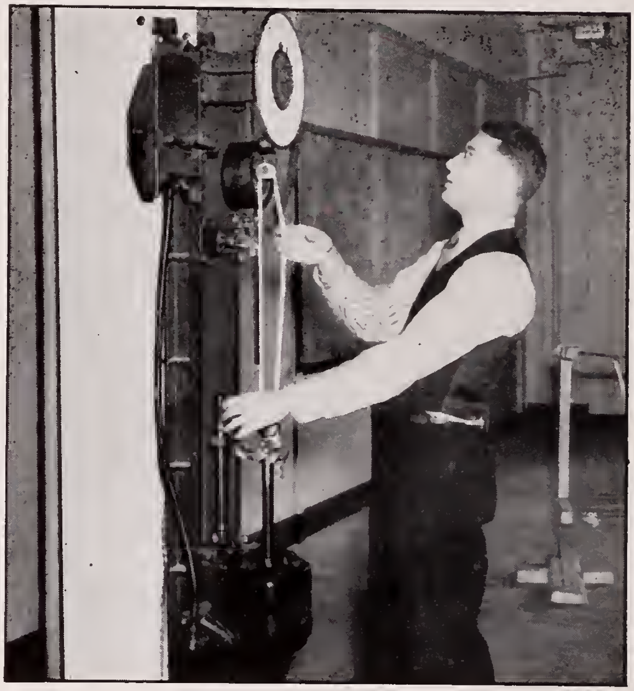
H. H. Willis, Dean of Clemson Textile School, was reared at Clifton, S. C. He has had approximately nine years of practical experience in general textile work with Clifton Manufacturing Company at intervals prior to 1917. Shortly after graduation from Clemson College in 1917 he enlisted in the army for the duration of the war. He served as a private and sergeant at Fort Screven, Georgia, and in September, 1918, was commissioned a Second Lieutenant and sent to Edgewood Arsenal, Maryland, as property officer. He was later transferred to Camp Upton, New York, as paying officer during demobilization. He was honorably discharged in September, 1919, having served some twenty-six months.

After this service, he was with a bank in Spartanburg for a short time, resigning to accept an instructorship in the Clemson Textile School. He resigned this work in September, 1920, to accept a position as Assistant State Supervisor of Industrial Education in North Carolina. In 1921 he resigned this position to accept a position as Cotton Specialist with the U. S. Department of Agriculture, Bureau of Plant Industry.

He was connected with the U. S. Department of Agriculture from 1921 to 1930. During the first three years of his work with the Department of Agriculture, he spent considerable time in the Southwest (Texas, Arizona and New Mexico) in selecting certain varieties of cotton for spinning tests. Many of these varieties were tested at Clemson and in mills in the East. He made two surveys in Eastern mills with reference to the utilization of certain of these varieties of cotton.

In 1927 Mr. Willis was made dean of the Textile School at Clemson in addition to his duties as Cotton Specialist, in charge of the cooperative cotton spinning research work. He continued to act in these two capacities until July, 1930, at which time he resigned his government connection in order to devote full time to the Clemson Textile School.

Dean Willis is the author of some fourteen government bulletins. While on this spinning work he prepared some forty reports of spinning tests mainly for the information of the Cotton Division of the U. S. Department of Agriculture. He is also the author of some eighteen articles which have appeared in various textile magazines. He is the co-author of some seven books dealing with cotton yarn manufacturing. These books were prepared in cooperation with the Textile Foundation, Washington, D. C. On this work he was assisted by R. K. Eaton, Gaston Gage, W. G. Blair and G. H. Dunlap, members of the textile staff, and Miss Vernette B. Moore, specialist in educational methods.



PROF. DUNLAP, TESTING

It was through Mr. Willis's untiring efforts that Clemson College succeeded in having constructed its spacious and up-to-date textile building which is equipped with very adequate laboratories and some of the newest machinery out. Much credit is due to him as a Pioneer in the Textile Industry and the building of the Clemson Textile School.

(Continued on page 20)

North and South American Cotton Production

By William R. O'Shields

The cotton-textile industry has migrated from Old England to New England, and from New England to the South, and today one of the most important questions in the South is, "Are we going to be able to keep our Southern Textile Industry in the United States or is it going to South America?"

The textile industry since its transformation from England to the United States has been one of the largest, most important, and most progressive of our American industries. Although the king of England placed severe restrictions upon the exportation of industrial machinery to the colonies, plans for the development of textile establishments and textile machinery were transferred mentally to the colonies. In addition to placing restrictions on exportations, he endeavored to prevent the immigration of skilled textile laborers, but in spite of his actions the steadily increasing number of immigrants, most of whom were skilled textile operatives, contributed greatly to the rapid progress of the textile industry in New England. The first industries which were established in the colonies were located in Philadelphia and Massachusetts.

Samuel Stater came to America in 1789, and through his genial and determined actions probably contributed more to the development of the textile industry in the colonies than any immigrant America has ever known. By his continual success in establishing industries in New York, Rhode Island, and Pawtucket River, he was appropriately named "Father of The American Manufacturers." The chief sources of power in his plants were steam engines and water power. Most of the mills were located on or near streams and waterfalls. The first power looms were developed by Francis Cabot in 1814 and as a result of this loom the first complete cotton factory in the world was erected at Waltham, Massachusetts.

British competition proved almost fatal to quite a number of promising industries, but they received legislative protection against competitive prices by a series of tariff acts which gave the textile industry in America a chance to expand. As a result of this rapid expansion, to a great extent the development of the railroads was influenced. The cotton grown in the Southern states was marketed in Liverpool, England, while most of the cotton used in the factories in the North was secured from the West Indies. The seemingly unlimited demand for manufactured products afforded rich markets for the cotton grown in the South. After the Civil War, large scale production was developed to a degree never before attained, and the United States steadily advanced to first rank among manufacturing nations.

In 1927 the textile industry ranked second among all the industries of the United States in capital invested, and second in value of products. The number of wage earners employed by the textile industry is excelled by no other industries in the U. S. It leads all other industries in the number of industrial plants (26,483) and is second in the amount of motive power used. The reasons for the rapid widespread development in the South are the fact that the South's water power is unsurpassed anywhere in the North, and the development of mills near the source of raw material. Responsible for the Southward trend of the textile industry are the comparatively settled labor conditions and a better understanding and relationship between the employer and employee.

As a general rule the Southern mill operative is a fine, respectable, proud person, with high ideals and a great ambition. One of the greatest handicaps of the mill operative up until the present time has been the lack of education. Today our mill operatives are living on a much higher level. Compulsory school laws, and better and more efficient grammar and high schools, and to a very great extent, for our young men, the newly developed laboratories and textile schools, have trained our young men to be well-groomed citizens and leaders of tomorrow. Mill operatives have, nevertheless, the same characteristics that caused the people to rally after the end of the most devastating war history records, and without aid from the outside, build a new South—the industrial progress which history does not record.

"Cotton Production in the South"

Cotton is grown on about two million farms in the southern part of the United States. The crop requires hand work, and usually cotton pickers of all ages are in great demand for picking

(Continued on page 16)

The Editors' Page

SCOPE OF OUR MAGAZINE

How long the idea of a textile magazine remained in the back of somebody's mind will probably never be known. At a recent meeting of the PHI PSI fraternity all members were snapped out of their lethargy by the statement that the chapter should consider publishing a magazine as an activity for this session. The announcement was received with enthusiasm. A committee was appointed to look into the possibilities and to render a report at the next meeting, relative to publishing the magazine. The committee returned a comprehensive report, and a staff was selected from the members of the club.

Christmas intervened, and it was not until after the holidays that work began in earnest. The purpose of the magazine was to deal with the independence of the textile school and the industry, and to maintain control with the textile school graduates. We hope that THE BOBBIN AND BEAKER will serve as a medium of written intercourse between the industry and students. Criticism and suggestions are invited. We desire to establish a department of "letters to the editor." Among the readers there are those who can write very informative and instructive articles. We offer our facilities for rendering such a service to our readers. One need only to submit his rough draft and the staff will prepare it in a form suitable for publishing, return it to the author for approval, and publish the article in the earliest issue.

THE BOBBIN AND BEAKER tries to cover all phases of the textile industry. That is a big task. As students we can write only on general terms, or correlate reading material. It is up to the readers in the plants to give us the technical articles and discussions that will be the life of the magazine.

Due to the support received from business firms we are able to offer the magazine free of charge, despite the fact that it costs four and one-half cents to mail a copy. With an increased circulation it will probably be possible to obtain a cheaper postal rate. Any savings will be used in

(Continued on page 18)

WE ARE GRATEFUL

And as this, the first issue of our brain child, goes to press we wish to take a few minutes' time out to express our grateful appreciation to those who have made publication of THE BOBBIN AND BEAKER possible.

First, we appreciate the cooperation of Dean H. H. Willis of the Clemson Textile School, and of the Clemson College Business Manager and his staff who have lent valuable financial and practical advice and aid. To Professor R. K. Eaton, head of Carding and spinning at Clemson we owe a debt for valuable advice and help. We appreciate the guest editorial of Dr. William P. Jacobs, President of Presbyterian College (one of the numerous important offices that he holds) and the articles that our friends have written, as well as the information and valuable assistance they have rendered.

To our advertisers we say "Thank You!" We hope that our services will prove as valuable to you as yours are to us. THE CLEMSON TIGER, AGRARIAN, and TAPS, already well-founded publications of Clemson, have also helped in many, many ways, and the staffs of these periodicals have been ever-willing to render any assistance possible.

Thanks, too, to the Clemson Textile Students who have done the actual work on the magazine.

And last but not least, we wish to thank the Observer Printing Company, of Greenville, for their part in helping to found the first college magazine in the South.

THE BOBBIN AND BEAKER, in its swaddling clothes, greets its friends and says, "Thank you again."—C. E. A.

DISTRIBUTION

Of the three thousand copies of THE BOBBIN AND BEAKER printed, two thousand copies will find their way into textile plants of North and South Carolina, and the remaining thousand will be distributed to students, alumni and friends. The address to which this copy has been sent is on our permanent mailing list. If the address should be changed, extra copies desired, or a new member wishes to be added to the mailing list, we will be glad to oblige.—E. R. R.

Short Features

CLEMSON TEXTILE SCHOOL

By D. J. Ross

Clemson Textile School moved into its new plant in September, 1938. This new building cost approximately $475,000, and has 127,000 square feet of space.

Clemson, having 335 students, has the largest four-year day enrollment of the ten textile schools in the U. S.

According to the records of this office the textile students are located in states per the attached. No doubt many of those in the column marked "Doubtful" are in textiles or allied industries.

During the past ten years approximately 95 per cent of the textile graduates have gone into textiles or allied work such as teaching textiles, textile sales, etc.

The enrollment has grown from some four or five students in 1898 to a present enrollment of 335. In addition to this number, we have about ten students taking special textile work, making a total of 345 students.

The demand for Clemson textile graduates has been very high for the past ten years. After placing all of our graduates who wished a job, we have had each of these ten years many additional calls for men which we were unable to fill.

	Clemson Textile Men			
Location	In Textiles	Non-Textile	Doubtful	Total
Alabama	14	1	5	20
California	1	1		2
Connecticut	1		1	2
Florida	--	4	2	6
Georgia	65	3	14	82
Illinois	3		--	3
Japan	--		1	1
Kentucky	--	1	1	2
Maryland	3	3		6
Massachusetts	5	--	--	5
Michigan	1		--	1
Mississippi	--	--	1	1
New Jersey		--	1	1
New York	18	3	2	23
North Carolina	98	6	14	118
Ohio	1	--	--	1
Oklahoma	2	--	--	2
Pennsylvania	8	3	1	12
Philippine Islands	--	1	1	2
South Carolina	291	85	177	553
Tennessee	9	1	--	10
Texas	5	1	--	6
Virginia	12	3	--	15
Washington, D. C.	3	1	--	4
Total	540	117	221	878
Per cent	61.503	13.325	25.170	99.998

37TH ANNUAL PHI PSI CONVENTION AND TEXTILE EXHIBIT

For three days, April 11, 12, 13, Phi Psi alumni and members will convene in Philadelphia, Pa., at the Bellevue-Stratford Hotel. These annual conventions have always been a moving force that has bound the brothers closer together, diffusing the fraternal fellowship among the many scattered chapters.

The usual business meetings and social engagements are to be accompanied with tours of historical Philadelphia and displays of textile exhibits sponsored by chapters and members. Not the least of these displays will be THE BOBBIN AND BEAKER sponsored by the Iota chapter of Clemson College.

All Phi Psi members are urged by the grand council to send in their registration cards as early as possible. Any information desired concerning registration, accommodations, displays or exhibits, or other phases of the convention may be obtained from one of the following committee chairmen, all of whom are in Philadelphia:

Ways and Means: J. E. Fite, Jr. 1952 E. Allegheny Avenue. **Chapter Contact:** Chas. W. Neeld, Jr., 134 Chestnut Street.

Alpha Chapter: Thomas Gold, Gladstone Apartments, 11th and Pine Streets.

Exhibits: Benj. K. Archer, 123 S. 2nd Street.

Publicity: Theo. B. Hayward, 400 Chestnut Street.

Entertainment and Program: Elmer T. Lewis, 246 W. Upsal Street.

Registration and Finance: DeHaven Butterworth, York and Cedar Streets.

Reception: Percival Theel, Philadelphia Textile School, Broad and Pine Streets.

Brothers, the Mecca is Philadelphia on April 11, 12, 13, all roads will lead there.—E. R. R.

ARTIFICIAL FIBERS IN THE SPOTLIGHT

(Continued from page 5)

rayons. Its softness and drapability instantly won it to women's dress wear. Not being highly absorbent, stains are more easily removed in cleaning. Cross dye effects and crepes with rayons insure acetate its place among the other rayons.

Each type of rayon has its distinct properties and peculiarities that must be dealt with throughout the processing from the producer to the ultimate consumer. Lanital, Vinyon and Nylon will present problems that haven't been tackled yet. The latter is peculiar in that its wet breaking strength is about three times greater than cuprammonium which possesses the highest wet strength of the rayons. The density of nylon may be varied without a change of filament size. The first nylon was so hard that it wore away the spinning needles in knitting hosiery. New fibers are received today by an eager, inquisitive public. Such was not always the case.

The first rayon fabrics were not what they are today. Colors were not always fast. The fact that rayon is much weaker wet than dry, and the fact that its largest consumption product has been in women's dress wear, which are often home laundered has been a draw back. Before research in the dry cleaning industry, rayon fabrics were affected by certain solutions. Nowadays, any reputable cleaner can handle the best rayon fabrics without the danger of injuring them. Acetate should be cleaned with caution. Cleaning solutions containing acetone, chloroform, or ether will tender acetate rayon and should never be used on it. In the home laundering of rayons, they should be washed with a mild soap in warm sudsy water. The goods should be rubbed lightly and never scrubbed vigorously, bearing in mind that rayons are weakest when wet. Never wring out the goods. Squeeze them to remove excess moisture, wrapping them in a dry towel will facilitate drying. Do not place the garment in direct sun light to dry. If the material is knitted, dry flat on a towel, pinning it into shape. An electric iron that is too hot will injure rayon. Use a warm iron or iron the goods under a cloth. Cuprammonium rayon will stand about the same heat that may be applied to cotton. The other rayons are more sensitive to heat, acetate being affected most.

Of recent years, rayon staple fiber has become popular as woven fabrics. Any type of rayon may be cut into various staple lengths and processed by the same machinery that handles cotton or wool. Rayon staple consumption has steadily risen since 1929 when the U. S. consumption of rayon staple fiber was only 500,000 pounds, until 1938 when 29,833,000 pounds of U. S. produced staple were processed. In 1938, a total of 43,500,000 pounds were processed in the U. S. That year, the U. S. was fifth in the production of rayon staple fiber with 29,860,000 pounds. Japan was the largest producer, manufacturing 375,000,000 pounds, followed by Germany, Italy, Great Britain, and the U. S., respectively. In 1938 the cotton industry consumed 90 per cent of the staple fiber processed in the U. S. The woolen and worsted industries consumed the other 10 per cent. Rayon staple offers to the cotton mill manufacturer a new and different product which he may produce with only minor changes in his existing cotton manufacturing machinery. Rayon continuous filament has constituted only a small part of mens' clothing, but rayon staple has introduced an innovation in that industry. The wool blended twill in slacks and polo shirts is especially popular in mens' wear. Light weight summer suits are being made partially or wholly of rayon staple. "Congo" cloth is made of spun rayon and filament twisted together. These garments are cool, crease resistant, color-fast, perspiration proof, and light in weight. Women are large consumers of spun rayon made into beach pajamas, swim suits, jackets, and skirts, and other summer fabrics. The consumption of rayon staple is overhauling filament yarn. World consumption was almost equal for the two yarns in 1938. The cost of rayon staple based on 1 1-2 inch staple has steadily decreased from $0.60 per pound in 1928 to $0.25 per pound in 1937. The 1937 price was one half of the 1931 price. The dull viscose staple is usually two cents per pound more than bright viscose staple.

Of the other non-cellulose fibers, the most notable are Nylon, Lanital, and Vinyon. For the former the Du Ponts have just spent $11,000,000 on plants that can turn out about 4,600,000 pounds of Nylon a year, almost all of which will be made into yarn. As yarn, nylon will be for the greater part made into womens' hose. As hose it is claimed that nylon will outwear silk, make possible greater sheerness, and undersell silk 15 per cent. Nylon hosiery yarn for knitting will sell for $0.25 to $4.55 per pound. Raw silk for the same purpose sells for $3.75 to $5.00 per pound. Last year 45,000,000 pounds of Japanese silk were used in making hosiery. With the war both in Europe and Asia making the supply indefinite and prices high, never could a more timely entry into the silk industry be made than now.

A potent competition of the woolen industry appears to be "Lanital." However this product at present is confined to Italy. Its introduction in this country would not be as a competitor of silk, but as an outlet for a product which is in great abundance in the U. S. This product is casein. At present, only a small portion of the available casein is consumed. This product is obtained from milk and used as a binder or plastic.

The problem in Italy has been the collection of the milk and this is one of the most expensive factors of the raw material. The price has risen from 2 lire per kilogram to 10 lire per kilogram. A lowering of the price of raw wool in the international market makes the price of milk relatively higher. A new factory is under construction in Italy that will be capable of increasing the production of "Lanital" by 25,000 kilograms (55,000 pounds) daily. Japan has secured the Ferretti patent for the manufacture of Lanital. The Union of South Africa has sent investigators to Italy to study the new fiber both as a competitor of raw wool and as a consumer of milk, of which that country has a large enough store to bid for a world market.

The Carbide and Carbon Chemical Corporation have perfected a raw textile fiber called "Vinyon." The fiber is one of several separate and distinct types of vinyl polymerization products which this company has developed since 1927. The fiber is made by a modification of the "dry spinning" modification from a white fluffy powder which is a special grade of "Vinylite" synthetic resin. The American Viscose Corporation is manufacturing Vinyon for commercial production.

The tensile strength may be made to vary from 1.0 to 4.0 grams per denier. Its wet and dry breaking strength are about the same. The fiber may be delustered, and its elasticity ranks with that of silk. The fiber is resistant to acids and alkalies. This fact adapts it excellently as an industrial filter fabric. Both in the continuous filament and staple fiber, Vinyon is expected to be knitted or woven into long wearing garments such as full fashioned hosiery, bathing suits, chemical workers' clothing, raincoating, umbrella fabrics, and tent and awning material.

Lanital, Nylon, and Vinyon besides having properties different from rayon are unique in that they are a strict departure from a fiber of a cel-

(Continued on page 20)

IMPORTANCE OF THE CLEMSON TEXTILE SCHOOL

(Continued from page 6)

We should all be interested in this evolution which is taking place in cotton manufacturing. All applauded when the farmer began to use tractors and other modern machines and would have been indignant at the suggestion that all farmers should destroy their automobiles, trucks, and tractors. We encourage the use in agriculture of all scientific discoveries and are about to have a chance to encourage cotton manufacturers in the use of scientific methods and wonderfully improved apparatus. The Clemson School of Agriculture has helped the farmer to make use of all discoveries, and the Textile School would be very backward if it did not keep up to date and train its students to be prepared to use all modern improvements in manufacturing.

Just as the Agricultural Department is the source of scientific information for farmers, so our Textile School should be the source of information for scientific manufacturing.

The Dean of the Textile School and the heads of the various departments realize that they will be called on more and more for aid in spreading of scientific information to the mills of the state. They also realize that they are instructing the future manufacturers. We say to our students, "That is the way it is done now, but this is the method which will be used by the time you have passed your apprenticeship."

In South Carolina there are one hundred and sixty cotton manufacturing plants. Every one of these mills must have managers who are equipped with the fundamental knowledge, necessary to produce saleable fabrics; they must have that knowledge before they can choose their superintendents and overseers. A course of study in a textile school is always beneficial to these managers. They in turn are demanding that their superintendents and overseers shall be textile school graduates, and are seeing to it that there are young college men in minor positions who have the mental equipment necessary for advancement when the opportunity arises.

We estimate that there are at least thirty-five hundred jobs, in the mills of this state alone, which should be held by textile school graduates. We believe that the time is coming when there will be at least 2000 Clemson men actively connected with our cotton mills. At the present rate

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NORTH AND SOUTH AMERICAN COTTON PRODUCTION

(Continued from page 11)

from August through November. The crop on an average is about 13 million bales each weighing 500 pounds. About one-half of our cotton crop is used in our own mills. The remainder is exported, chiefly to Japan, Great Britain, and the continent of Europe.

There are about 13,000 gins in this country operating through a season of two to six months. About 330 compress plants are distributed through the cotton belt. Most of our 1200 domestic cotton mills that manufacture raw cotton into yarn and cloth are located in the cotton growing States. Massachusetts leads the non-cotton-growing States in manufacturing cotton.

In 1915 the Southern mills processed 53.1 per cent of all the cotton consumed in the United States, while the New England mills processed 36.5 per cent. In 1920 the number of workers engaged in textile industries in the United States numbered 1,383,805. In 1927 Massachusetts led in the percentage of distribution of spinning spindles, followed by North Carolina, South Carolina, and Rhode Island. Of the 151,745,000 spindles of the world, 18.6 per cent are located in South Carolina, 30.1 per cent of which are located in a radius of 30 miles of Clemson College. According to the census of manufactures in 1933, wage earners in Textile plants in North Carolina totaled 89,416, in South Carolina 75,718, and in Georgia 58,383.

"Cotton Production in Brazil"

To give one some idea as to the size of Brazil, its area is larger than the territory occupied by the continental United States. Only 31,067,000 acres, or 1.5 per cent of the total 3,286,770 square miles are cultivated. Approximately 50 per cent of the total acres are covered by forest. The area in Brazil which is suited for cotton growing is equal approximately to the combined area of Oklahoma and Texas. The population is approximately 45 million people, as compared to that of the chief cotton producing states of the United States which is 25.5 million. Therefore, the two great facts which must be seriously considered in any discussion of Brazil's cotton growing and manufacturing potentialities are population and area. Another important and chief limiting factor, until the present, has been an inadequate supply of intelligent labor, but through the introduction of modern machinery and the influx, to some extent, of capital and immigration, the labor problem has been solved temporarily. The chief reason why Brazil's cotton production has expanded is because coffee prices have been greatly depressed while Brazilian cotton has found a ready market, therefore, its production is likely to increase as long as its cotton market remains or increases in magnitude.

There are two distinct cotton regions in Brazil, the most important one is in Southern Brazil and the second most important area is in Northeastern Brazil. The dates of planting and harvesting in these two regions differ. In Southern Brazil the planting period is from September through November and the harvesting takes place from February through May, whereas in Northeastern Brazil the planting period is from February through April and the harvest is September and November.

With regard to the 1937-38 season, 707,595 bales were produced in the Northern District, while 1,367,127 bales were produced in the Southern District. The 1938-39 crop was somewhat smaller than the '37 crop, in that 650,772 bales were produced in the North-eastern district.

Brazilian cotton today is not the same as Brazilian cotton of a few years ago. A large American cotton company is building modern gins and making trade agreements in Sao Paulo. The Brazilian cotton this year is one-half cent less in price for the same types as domestic staple and is well up to 1-1-8 inch in length. It compares favorably in grade and character with American cotton, and this is one of the many reasons why Brazil's cotton market is rapidly expanding.

The Brazilian Cotton Textile Industry

Other than fine counts which it does not as yet produce, Brazil for some considerable time has been self supporting in textiles, particularly cotton cloths. Most of the mills have been working overtime to the extent of two and three shifts of eight hours, and have been building up large stocks or overproducing to a large extent. Many manufacturers have tried to find suitable outlets for their excess production in foreign markets, but trying to meet the price of dumped cloth of other countries in foreign markets has not shown profitable results. "According to decree promulgated in Brazil on April 3, 1939, the installation of new machinery for the purpose of producing commercially synthetic materials to substitute agricultural and animal commodities such as wool, rubber, silk, and cotton is prohibited."

Brazil is the principal cotton consuming country in South America. Cotton consumption in Brazil, practically all of which is Brazilian cotton, and the number of spinning spindles is shown in the table below.

Season Aug. 1-July 1	Number of Running Bales	July 1st	Spinning Spindles in Brazil
1930-31	309,000	1931	2,690,000
1931-32	367,000	1932	2,690,000
1932-33	357,000	1933	2,620,000
1933-34	420,000	1934	2,702,000
1934-35	558,000	1935	2,709,000
1935-36	657,000	1936	2,712,000
1936-37	699,000	1937	2,714,000
1937-38	828,000	1938	2,725,000
1938-39	619,000	1939	2,750,000

Today the manufactures of cotton textiles ranks first among Brazil's manufacturing industries. It has long been an important industry, for as early as in 1886 Brazil had nine textile mills with 385 looms and 14,875 spindles, employing 766 workmen. Within the next nineteen years (1905) Brazil had 110 mills, with approximately 39,000 workers. The industry has enjoyed a very rapid growth since the early 1900's and in 1920 Brazil had 569 plants, with 126,171 looms and 2,968,175 spindles giving employment to 118,809 workmen.

From this discussion you can readily see that the United States has over nine times as many spinning spindles as Brazil. Brazil has had a very hard time trying to compete with the prices fixed by the leading cotton manufacturing countries. Brazil's cotton production and manufacturing is likely to increase as long as the market remains or increases in magnitude.

The table below will give an indication of how the U. S. ranks among the leading cotton manufacturing countries of the world. One will readily see that the United States ranks second only to the United Kingdom and has about three times as many cotton spinning spindles as the third largest cotton manufacturing country which is Germany. Comparing the cotton spinning spindles in Brazil, we find that the number of spinning spindles in the United States is nine times as many as those of Brazil.

Country	Cotton consumption of Amer. cotton*	Spinning Spindles
Great Britain	538,000	36,322,000
United States	3,332,000	25,911,000
Germany	179,000	12,967,000
Japan	390,000	11,502,000
Russia	1,350,000*	10,350,000
India	54,000	10,054,000
France	294,000	9,794,000
Italy	188,000	5,324,000
China	31,000	4,450,000
Brazil	365,000	2,765,000
Canada	120,000	1,159,000
Mexico	86,000	889,000

(in thousands of actual bales)

*Sundries.

A FUTURE IN TEXTILES

(Continued from page 3)

ing. We need more plants for manufacturing wearing apparel, household utilities, and various other cotton and rayon textile products to widen the market for the mills of the South.

If you are a textile student; if you are looking for a brighter future my advice to you is learn the essentials of textile selling, merchandising and marketing, the essentials of textile fabricating along with the fundamentals of weaving and spinning.

The opportunities in South Carolina are as brilliant as anywhere else in the world. The horizons in South Carolina are just as wide as the world itself. All that is required is personal ambition, individual initiative and the determination to succeed.

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Specialists in
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GRADES VS. PERSONALITY

By WADE CARTER

It has long been a question for the student as to which he will be most benefited by, obtaining high grades or developing his personality. There is no doubt that a good personality is most desirable, but when a student neglects his studies in developing what he hopes to be a dynamic personality, then it should be made known to him that a good personality is not the only desirable quality that one should have. Then too when one spends all of his time studying in order to obtain high grades and fails to observe what is going on around him and does not obtain a better understanding of human nature, he will be sadly lacking when he gets out into this world of affairs. Such statements as the following are not uncommon: "John Doe makes excellent grades, yes, but he has no common sense. His mind is as narrow as his vision from his eyes to a book," or "Bill Jones is one of the finest fellows I have ever known, and he seems to be very intelligent, but I cannot understand why he doesn't make better grades."

Upon being asked which he thought was more important, grades or personality, a Clemson alumnus with twelve years experience in a rayon mill stated: "There are probably a lot of good arguments for both sides. However, I think that grades in themselves, though they may get you a job without an interview, are only a matter for record and mean absolutely nothing unless you really know your subject. Personality is of major importance when you are being interviewed for a position, but it will never hold that position unless you know your subject. You will find out that one learns more about textiles during the first six months on the job than he did in four years at college, but do not forget that one needs a college education to get the job that will enable him to really learn the work. It has been said, 'It isn't what you know but who you know that counts,' but personally I think some of both is necessary."

It is evident that one should strive to obtain a good general knowledge of his subject and to develop his personality at the same time, and in so doing, one will have less trouble in coping with the problems he will have to face in the future.

SCOPE OF OUR MAGAZINE

(Continued from page 12)

improving the magazine. All financial transactions are handled through the Clemson College Business Manager.

To advertisers our circulation offers a broad field. Not only does the magazine offer the advertiser a personal contact with the industry, but young men who will wield an influence in the near future are also made aware of their services.

Though the magazine was originated by and through the efforts of PHI PSI, and its staff is now composed only of PHI PSI members, the succeeding officers will be chosen from the entire textile school. If the students and the industry receive THE BOBBIN AND BEAKER as sincerely as have our patrons, the advertisers, our success is assured.

TO OLD GRADUATES

Due to the fact that we do not have a paid subscription list, we have been unable to secure a second-class mailing permit. By offering a subscription rate, we will be able to mail the magazine at a much lower cost.

Fill in the blank below and return at once.

The future depends on the reception from the textile alumni and the textile industry.

We are inserting a blank for this purpose, however the present mailing list will remain the same.

SUBSCRIPTION BLANK

Find enclosed $1.00 for which send The Bobbin and Beaker 3 years.

Signed ____________________

Box No. or St. ____________________

Post Office ____________________

COLLEGE GRADUATES IN THE TEXTILE INDUSTRY

(Continued from page 4)

even get started. Pull can get you a job, but it can't keep it for you. In some businesses pull is almost necessary to get a job, in others it is not quite so important. Be careful of the job you take. A job which pays the most at the start may not be the best job. There may not be a chance for any advancement. If necessary take a job that may pay less than another job you might have if it has more promise for advancement. Getting a job is not the hardest part. Holding it is where the real test comes. No matter what kind of job you have, make it as important as any job in the business. Make yourself indispensable. Do a little more than just enough to get by. You have a product to sell—yourself, just as a butcher has a product, a lawyer or a doctor. Make your own services the best product available and there will be a big demand for it. Advancement cannot be achieved by pulling down those above you or stepping on those below. Advancing in the business world is comparable to climbing a ladder. The only way you can move upward is by pushing up those above you and those below you will move up as you do.

There is no one formula for success. Hard work is one sure means that has been practiced for ages. Keep your eyes open for any opportunities that may present themselves. If you really think you have an idea that will be helpful don't hesitate to present it. At the same time don't be a smart alec just because you have a college degree. Knowing how to listen is as important as knowing how to talk in many instances. At times it may seem that there are no chances of making a success out of textiles as a career. Other pastures may appear greener than your own at times but they really aren't. If you work hard and keep your eyes open there is a place for you somewhere if you'll stick long enough to find it.

The introduction of synthetic fibers into the field of textiles is opening up practically a new field. The fibers themselves are new. There aren't many men experienced in handling them. The manufacture of these fibers and converting them into cloth is going to require trained men, men who know what they are doing. The dyeing and finishing of materials made from these new fibers is going to require men who are trained for this specific purpose. College men are the ones who can and will fulfil this need. The use of the fibers is in its infancy. Its possibilities are limitless and so are the opportunities for those connected with it. The opportunities for the college trained man are greater now than at anytime and there is every chance of a successful career in the field of textiles.

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SOMETHING ABOUT OUR FACULTY

(Continued from page 10)

R. K. Eaton,
Professor of Carding and Spinning

Mr. Eaton attended Bowdoin College, Brunswick, Maine, receiving his A.B. degree in 1905. The following year he took up the study of Textile Chemistry and Textile Designing at the Philadelphia Textile School.

After completing these courses in the study of textiles, Mr. Eaton joined the firm of The Whitin Machine Works and for the next three years was employed in erecting cards and spinning frames. From 1909 to 1910 he was associated with the Whitin Experimental Waste Plant, Ashburnham, Mass.

Desiring to enter into another field, Mr. Eaton accepted a position as assistant to Agent in charge of cloth contracts with Cabot Manufacturing Company of Brunswick, Maine. This position he held until 1917 when he was to take part in the war as a first lieutenant in the Chemical Warfare Service until 1919. He then went back to take charge of cloth contracts on novelties and curtain materials with the Cabot Manufacturing Co. up to the year 1921.

Due to failing health, Mr. Eaton came south to live in 1923. It was then that he was made professor of weaving and designing at Clemson College, later being transferred to head of Carding and Spinning Department. This position he still holds.

It is indeed a great fortune to Clemson College to have such a man as Mr. Eaton in its Textile School. His sound judgment and varied knowledge has been recognized by his many students and college officials as a great contribution to the upbuilding of one of the most recognized textile schools of the nation.

Joseph Lindsay, Jr.
Professor of Textile Chemistry and Dyeing

Mr. Lindsay first received his A.B. degree from Erskine College in 1919, continuing his studies at the University of North Carolina during the year 1923. The year following he took up graduate study at the University of Chicago which was to be followed by a summer course at the Massachusetts Institute of Technology. After this varied field of education, Mr. Lindsay rounded out his study of Textiles at the Philadelphia Textile school.

Being well fitted to set out in a high standing field, Mr. Lindsay accepted the position as Technical Representative for the General Dyestuff Corporation, Charlotte, North Carolina, in the year 1925. This position he held nine years.

Wide experience and a varied knowledge of the chemistry field in the Textile Industry, prepared him to be the head of Textile Chemistry and Dyeing at Clemson College in 1934, and he is rendering his capable services in this capacity now.

A. E. McKenna,
Head of Weaving and Designing Department

Mr. McKenna graduated from the Rhode Island School of Design in 1932 and later attended the Bradford Durfee Textile School evening course in spooling, warping, and slashing.

He spent 5 years employment with the Mount Hope Spinning Company of Warren, Rhode Island, as head of the card room and later the weave room.

He came south to increase his knowledge of textiles, receiving his B.S. degree from Clemson College in 1930. In 1933 he received a M.S. degree from the University of Tennessee.

Mr. McKenna's highly esteemed knowledge in weaving and designing has justified a number of articles published in the Melliand Textile Monthly on such subjects as leno, jacquard design, and dobby design.

It can be said with all sincerity that through his efforts the Clemson College Textile Weaving and Designing Department has become outstanding.

ARTIFICIAL FIBERS IN THE SPOTLIGHT

(Continued from page 15)

lulose base or compound. It would appear that the trend is not only new and different properties of the existing man-made fibers, but new and different fibers for the individuals' adornment.

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IMPORTANCE OF THE CLEMSON TEXTILE SCHOOL

(Continued from page 15)

of graduation it would take us 100 years to fill all these jobs.

We see our graduates rise, not gradually, but by tremendous jumps. What greater incentive can a school have than that?

There is no group of textile school graduates in this country that is equaling the accomplishments of Clemson men. Not only are they beginning to show the way in manufacturing, but they are leading the scientific research in the use of cotton. The Department of Agriculture research division is manned almost entirely by Clemson graduates. Many a boy who never saw a cotton mill before coming to Clemson is now well established and competent to rise to the top.

Clemson Textile School will increase in importance in South Carolina because we are preparing young men to enter an enormous industry, where there are hundreds of jobs and unlimited opportunities for advancement. Our graduates will be prepared to use advanced methods which are beginning to be recognized by manufacturers.

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WANTED: MEN

Guest Editorial

BY ALAN B. SIBLEY

When I graduated from college a very successful lawyer said, "Son, you can put this in your pipe and smoke it; there are more good jobs than there are good men to fill them." The man who spoke those words had started out in a small town, later gone to a large southern city with a reputable law firm. He was the oldest son in a large family and had worked his way through college. He had no "pull" or "connections" to help him. All he had was the ability to win cases and that was all he needed.

I must confess that when he told me that, my reaction was, "Well you were lucky, you got the breaks." But as I have grown older and have been in the "market" for good men, I have thought a thousand times of what this lawyer said to me then.

Alan B. Sibley graduated from Georgia Tech in 1925. He was cost man and assistant superintendent of the Laurens Cotton Mills from 1929 to 1933. In 1934 he became superintendent of the Darlington Manufacturing Company, and in 1936 became superintendent of both the Darlington Manfacturing Company and Hartsville Cotton Mills. In 1938 he was made treasurer of the Darlington Manufacturing Company and in 1939 became vice president and treasurer of the Judson Mills. Mr. Sibley is now treasurer of both the Judson Mills and the Laurens Cotton Mills.

In the various executive capacities which Mr. Sibley has held he has been directly connected with the personnel department; and, in such a capacity, he has served the college student as well as the college graduate well. Today, we feel that no one man in the textile field is better qualified to advise the textile student than Alan B. Sibley, and it is with great pleasure we present his guest editorial, WANTED: MEN!

You who are studying textiles are going into the largest industry in the United States. There are many phases of the industry that challenge the youth of today. There is the research and chemical division, the printing and dyeing division, the manufacturing end, consisting of spinning and weaving, and the selling end. Surely, no industry offers such a wide diversification of opportunities as does our industry.

But what kind of men are WANTED today by government, by industry, or in professions? And what questions must you ask yourself to qualify as a WANTED man? First, am I honest? This is number one on the list. Are you shocked when you read in the papers of men in high places who are not honest? Honesty covers a lot of ground but to be honest with yourself is most important; for if you are honest with yourself, you will unquestionably be honest with others.

Secondly, am I courteous? If you are not courteous, you are certainly in the wrong industry. If you are courteous, you will find employees in the textile mills most kind, helpful, and interested in seeing you succeed. The people in the mills are courteous, and they will go out of their way to help you if you are appreciative.

Third, am I humble or do I know all the answers? There isn't anyone who knows all the answers, and there will be many times in your life when you will be glad to have the cooperation and suggestions of others. And when you do receive help, don't hesitate to give credit where credit is due, the world demands this today.

Another ingredient in the WANTED MAN is: will he work? You may have the keenest brain in the world, but if you are not willing to exert yourself and do more than the other fellow, you won't be sought after. When you buy an article in a store, you buy it because you believe that article is either worth what you paid for it, or is worth more than you paid for it. Your services are the only thing you have for sale, and to succeed you must give full value and a bargain. If you are looking for an easy

(continued on page twenty-two)

USEFUL DATA

To find circumference of circle multiply diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find area of a circle multiply square of diameter by .7854.

To find area of a triangle multiply base by one-half perpendicular height.

To find surface of a ball multiply square of diameter by 3.1416.

To find solidity of a sphere multiply cube of diameter by .5236.

To find cubic inches in a ball multiply cube of diameter by 5236.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U. S. Standard) weighs 8 pounds, one-third ounce, and contains 231 cubic inches.

A cubic foot of water contains 7 1-2 gallons, 1,728 cubic inches, and weighs 62 1-2 pounds.

To find the pressure in pounds per square inch of a column of water multiply the height of the column by .434.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 pounds to the square inch).

A standard horse power: The evaporation of 30 pounds of water per hour from a feed water temperature of 100 degrees F. into steam at 70 pounds gauge pressure.

To find capacity of tanks any size; given dimensions of a cylinder in inches, to find its capacity in U. S. gallons: Square the diameter, multiply by the length and by .0034.

To ascertain heating surface in tubular boilers multiply two-thirds the circumference of boilers by length of boiler in inches, and add to it the area of all the tubes.

One-sixth of tensile strength of plate multiplied by thickness of plate and divided by one-half the diameter of boiler gives safe working pressure for tubular boilers. For marine boilers add 20 percent for drilled holes.

Millimeters × .03937 = inches.
Millimeters ÷ 25.4 = inches.
Centimeters × .393 = inches.
Centimeters ÷ 2.54 = inches.
Meters × 39.37 = in. (Act Cong.)
Meters × 3.28 = feet.
Meters × 1.094 = yards.
Kilometers × 621 = miles.
Kilometers ÷ 1.6093 = miles.
Square Millimeters × .055 = sq. in.
Kilometers × 3280.7 = feet.
Square Millimeters ÷ 645 = sq. in.
Square Centimeters × .155 = sq. in.
Square Centimeters ÷ 645 = sq. in.
Square Meters × 10.764 = sq. ft.
Square Kilometers × 247.1 = acres.
Hectars × 2.47 = acres.
Cu. Centimeters ÷ 16.387 = cu. in.
Cu. Centimetres ÷ 3.69 = fl. drs. (U. S. P.)
Cu. Centimeters ÷ 29.57 =fl. ozs. (U. S. P.)
Cu. Meters × 35.314 = cubic feet.
Cu. Meters × 1.308 = cubic yards.
Cu. Meters × 264.2 = gallons (231 cu. in.)
Litres × 61. 023 = cu. in. (Act Congress.)
Litres × 33.84 = fluid oz. (U. S. P.)
Litres × 2642 = gals. (231 cu. in.)
Litres ÷ 3.78 = gals. (231 cu. in.)
Litres ÷ 28.317 = cubic feet.
Grammes × 15.432 = grains. (Act Congress.)
Grammes ÷ 981 = dynes.
Grammes (water) ÷ 29.57 = fl. oz.
Grammes ÷ 28.35 = oz. avoirdupois.
Grammes per cubic cent ÷ 27.7 = lbs per cu. in.
Joule ×.7373 = foot pounds.
Kilo-grammes × 2.2046 = pounds.
Kilo-grammes × 35.3 = oz. avoirdupois.
Kilo-grammes ÷ 1102.3 = tons (2000 lbs.)
Kilo-grammes per sq. cent plus 14,223 = lbs. per sq. in.
Kilo-gram meters × 7.233 = ft. lbs.
Kilo per metre ×.672 = lbs. per ft.
Kilo per cubic metre × .026 = lbs. per cubic ft.
Kilo per Cheval × 2.235 = lbs. per H. P.
Kilo-Watts × 1.35 = Horse Power.
Watts ÷ 746 = Horse Power.
Watts ÷ 737 = ft. lbs. per second.

REVIEW OF NEW COTTON HANDBOOK

BY PROF. R. K. EATON

The first edition of the American Cotton Handbook is now being distributed and it will be welcomed by all who are connected with the cotton textile industry.

The authors are Professor G. R. Merrill, Lowell Textile Institute; Professor A. R. Macormac, Textile Chemist at Auburn (Alabama Polytechnic Institute); and H. R. Mauersberger, Technical Editor of RAYON TEXTILE MONTHLY. They have this to say in regard to cotton textile literature: "For many years the literature on cotton manufacturing has been scattered, fragmentary, incomplete and often of foreign origin. Whenever information was needed, men of the American Cotton Industry had to refer to a number of books because all reference works in the past have been written around some particular phase of cotton productive and manufacturing process. There was, therefore, a distinct and acknowledged need for a concise and authentic reference work on all phases of the American Cotton Industry."

The authors, except in their own fields, did not attempt to write all of the chapters contained in the Handbook but called upon others for contributions. These collaborators are men at the very top of the fields to which their chapters contribute. Textile manufacturers are all familiar with such names as Alston H. Garside, Charles K. Everett and E. R. Schwarz, to mention only a few of the authorities who helped give the Handbook its value.

The first chapter gives the historical background of the American Cotton Industry. It is concise in its treatment of this important subject and contains the important names and dates which are often difficult to find without reference to several books.

Chapter II, by A. H. Garside, deals with the economic background of cotton growing and manufacturing. As one would expect from this author this chapter gives information about the New York Cotton Exchange, cotton marketing, hedging and merchandising and many statistics in regard to cotton, cotton yarn and cloth production.

Charles K. Everett writes on the subject of Promoting and Merchandising of New Cotton Products.

Professor Schwarz's subjects are "Physical and Chemical Testing of Fibers, Yarns and Fabrics" and "The Use of the Statistical Method in Textile Testing."

There are eight chapters of about forty pages each covering all the yarn manufacturing processing including warping and slashing. One of these chapters will be of special interest since it treats on manufacturing cotton sewing thread; a subject on which it is hard to find any reference material.

One chapter (XIV) classifies cotton fabrics and lists the commercial fabric constructions. A few minutes' perusal of these pages will give the textile student some idea of the enormous possibilities of the cotton textile industry and the great chance of specializing in any field which interests him.

The designing and weaving of all of these fabrics are explained in some 112 pages including a special chapter on pile fabrics by Robert E. Smith.

There are chapters on knit goods and also all the finishing processes of bleaching, mercerizing, dyeing and printing.

The authors were not satisfied with giving all the information about growing cotton, marketing it, manufacturing it and finishing it but go one step farther and include a chapter on laundering written by the General Manager of the American Institute of Laundering.

The American Cotton Handbook also contains a chapter on English Cotton Literature. This is a "bibliography of books primarily concerned with the various phases of the cotton industry." This list is up to date and is almost worth the price of the Handbook to anyone who is called on to search out the solutions of textile problems.

I heartily recommend it to the readers of BOBBIN AND BEAKER.

Dr. Claudius T. Murchison has this to say of it, "Those whose connection with the industry are professional and those whose interests are economic and social will give equal welcome to this volume. It meets, as no other single volume, the requirements of practical usefulness."

NOTE: American Cotton Handbook is published by American Cotton Handbook Co., 303 Fifth Avenue, New York, N. Y.

CORK VS. LEATHER ROLLS

BY R. H. JONES, '42

In the early days the manner in which the top rollers were covered was a carefully guarded secret. The old-time roller coverer was looked upon as a sort of "Witch Doctor" or "Medicine Man." Each had his own way of covering a roll which he would disclose only to a relative or young apprentice.

As a result of this secretiveness all sorts of materials were used to furnish the extra cushion needed: cotton cloth, linen cloth, and woolen cloth. As far as anyone knew, no mills used the same materials. However, the cotton spinning industry was growing with such leaps and bounds that the natural labor turnover even affected the roller shops, and gradually, through the exchange of ideas, it became apparent to all that there was no better under covering than all-wool welt flannel.

The ideal roller covering must always, throughout its useful life, draw evenly and smoothly, without any variation and positively without any adverse results to either the cotton fibers or the strand. Its fiber-gripping and fiber-holding qualities must not vary with its age, or be unduly affected by environment. To attain this end, the roller covering must have a surface that always has a positive, even-drawing action on the fibers. In other words, it must not become slick causing slippage to take place. It must also draw of itself, that is, it must have a natural drag to its surface.

The ideal roller covering must be totally unaffected by conditions or materials with which it is apt to come into contact in a cotton mill. It must not be affected by heat or cold, humidity or oil.

Cushion is the other vital factor. The cushioning must not be spotty or local but must distribute the load uniformily over the entire surface. The perfect roller covering will be of material that can be repaired quickly, easily, and at low cost.

An early type of cork covering (an Armstrong patent dated June 18, 1918) was made of several thin sheets of cork "wound in convolute layers cemented to each other and also cemented to the roller." This first covering has been discarded as a failure.

Later on, a helically wrapped cot was developed. One type is a covering consisting of a hard fiber or glued fabric innerlines to which ribbon cork is attached, and the preformed tube cut into lengths. Another helically wrapped cot consists of a single thickness of cork ribbon requiring no innerlines and formed into a tube by cementing the edges of the ribbon material together—this tubing then being cut into cot lengths.

The chief advantages of the helically wrapped cot over previous cork covers lies in its form. Its chief disadvantages for cotton spinning lie in its construction. It does not get away from the troublesome seams, and particularly with cots possessing an innerline there are three or more glue jobs, all of which must be perfect to avoid trouble. Further, with the cot having an innerline, the thickness of cork is reduced, resulting in less cushion and a shorter life for the material. The stresses and strains set up in the cork during the wrapping operation tend to fracture the bond between the cork granules, resulting in premature breakdown in service.

The seamless cork cot is the final perfected development of cork as a rollcovering. Here, for the first time, a single thickness of seamless material is made available for cot use, doing away once and for all with troublesome joints or seams and presenting a uniform material in any wall thickness required, one having the utmost in cushion and resiliency.

The very latest development in seamless cot manufacturers has been the tubular or extrusion process, which is fully covered by patents. Cork cots made by this extrusion process guarantee the utmost in uniformity, resiliency, strength, and durability.

Cork has many properties, five of which are of especial importance in spinning of good yarn. They are:

1. High friction coefficiency.
2. Compressability.
3. Resistance to lateral flow.
4. Resistance to penetration of liquids.
5. Durability.

Cork posssses a very high coefficient of friction, and, unlike other materials, cork retains this property even when wet or in the presence of oil and grease. Its better pulling qualities minimize the effect of hard ends.

When cork is compressed, it is the trapped air in the cells that compresses. The strong cell walls do not change. When pressure is released, cork tends to return to its original shape. In spinning, this greater cushion is an added margin of safety.

Unlike many materials, cork does not flow or spread out under pressure, but compresses only in the direction of the force, its width or length remaining practically the same. In spinning yarn, this characteristic helps to maintain a true draft surface, since there is no bellowing out or tending to become barrel-shaped due to pressure.

Cork is highly resistant to liquid penetration, since it is cellular in structure and not fibrous. Unlike ordinary covers, it does not shrink or stretch with changing humidity conditions, it does not act as a wick to absorb oil, nor is there any "sweating of the cork roll in hot humid weather.

Cork has the remarkable capacity for retaining its initial properties practically unimpaired under all conditions where its use is recognized. Unlike most materials, it is not subject to progressive deterioration, and hence does not become less efficient as time goes on. The durability of cork as a roll covering material is well established not only for cotton spinning but also for rayon, worsted, and jute spinning.

To these physical properties of natural cork, modern research and manufacture add other values which mean the spinning of better yarn more economically. These are:

1. Ready adaptability to meet special service conditions.
2. Economy in handling, and through this, control of quality.

The Armstrong Buffing Machine plays an important part in the saving to be made from using cork. A cot worn from service may be made new again and again by resurfacing it. The worn cork cells are removed, bringing to the surface of the cot new, lively cork, and the roll is ready to go back in the frame for another full life of service. Rebuffing costs but one-half cent per roll, and with three or five rebuffings, or in all, four to six lives for each cot.

With the tailor made cork cot there is no scrap loss, no cutting or fitting, and much less time required in assembling and buffing for service. Figures from nine mills, which total 1,000,000 spindles, show a reduction of 50 per cent in hours of roll shop labor after adopting cork.

With a manufactured product, the roll may be placed in a precission grinder and buffed true and concentric within .001" from end to end.

The seamless cork cot, a quality product, is not high in first cost, so savings begin at once. Today's cot sells for nearly 40 per cent less than it did in 1931, and in a number of cases costs even less than some of the many grades of ordinary covers. For a 2½" guage spinning frame, the rolls require cots 1⅜" long, and these cots sell for 3¼c each.

The Arkwright Journal, June 1937 issue, in commenting on comparative yarn test from five different mills, makes the following statements in conclusion. "The yarn from mill No. 5 was far the superior of all yarns tested with respect to evenness of both counts and tensile strength. It is interesting to note that cork top rolls were used throughout.

The present seamless cork cot has met the increase demands of new machinery, which include higher speeds, heavier weighting, bulkier roving, and higher drafts. The margin of safety in cork is being recognized not alone, for more severe conditions, but for all services. For this reason, cork is fast replacing ordinary covers and is doing its part in helping the textile industry produce better yarns more economically.

The first leather for spinning rolls happened to be sheepskins, probably because they are by nature uniform in thickness and correct in thickness for cushioning a roll; but more important by far is that their natural grain provided a first-class surface, so good in fact, that sheepskin tanners have always taken great care to preserve it without blemish, as originally executed by nature. The best leather, however, is still bark-tanned, tanned by the slow process of immersion in hemlock liquors in still pits, the strength of liquors being gradually increased until the right temper is attained.

To quote Dr. Fred O'Flaherty, Director of Leather Research, University of Cincinnati, of Cincinnati: "Leather is the ideal material for cushioning since cushioning is the effect obtained by compression of a material, or the structure units of a composite material.

"Leather has a dual cushioning ability; first, the microscopic units of the fibers are compressible to both length and diameter. Second, the arrangement of the fibers in the architecture of the skin and subsequent leather is such that microscopic-sized spaces are present between the fiber bundles. Not only are there regular and numerous spaces, but they are all joined and intimately related with respect to each other, thus a piece of leather is dually compressible."

"When leather is compressed, the load is distributed over the neighboring fiber structure, and a more uniform cushion is obtained.

With the native architecture lending itself to cushioning effect, it is possible to regulate the degree and the character of the cushion by the tanning process. In no other material does one find this advantage."

It needs no proof and requires no argument to prove that leather is not affected by cold. There are no scientific instruments sufficiently sensitive to measure the difference, if any exists, in a piece of roller leather at 100° below zero and 130° above zero. If a change of 230° will in no way affect this leather, it is an absolute certainty that the small variation in a cotton mill will not do so. The same applies to humidity. Roller leather will act just as perfectly in a dense fog, as it would in an absolute bone-dry atmosphere.

It is probably true that many substitutes worthy to be given a trial will spin good yarn part of the time. They may go along for months doing excellent work, but the inevitable time will come when internal physical changes take place, and the rolls will cause so much trouble that they have to be recovered.

Leather will eventually wear out; yet the way it wears is one of its most valuable contributions toward maintaining the quality of the yarn. As soon as the grain surface which does the drawing starts to wear through, the tiny fibers underneath the grain surface begins to protrude and, before very long, get entangled in the fine cotton fibers, grasping them sufficiently firmly to cause the end to break, if it soon breaks again the spinner or the section man sees at once the need for a newly covered roll. No bad yarn had been spun and with the new roll, the spindle will go on producing the same high quality of yarn.

For spinning fine counts only the very best fine-grained lambskin should be used, weighing not over one ounce, which would approximate 20-1000" thick.

For spinning medium fine count, a light medium lambskin is used, which weighs in ounces about 1¼ to 1½ oz., in inches 20-1000 to 25-1000" thick.

For the coarser counts and card room work the larger, coarse-grained skins may be used; these will run about 30-1000" to 35-1000" thick.

With most substitutes, it is possible to buff down minor imperfections; however after a period of time, no matter how strict the buffing schedules, many sizes of rolls are in the frames with the consequent differences in the cushion. With leather-covered rolls, worn rollers are always replaced by new, first-class rollers, all the same diameter and of equal cushion.

The cost of leather-covered rolls depends very much on the type and quality of the materials being used and the size of the rolls. The annual cost per spindle depends, not only on the leather and the cloth, but on the type of yarn being spun, and how it is spun.

Sheepskin cots, exclusive of labor, cost anywhere from 1.5 cents to 3 cents each for ordinary short spinning double-bass roll. Calfskin cots will vary in price between 2.5 cents to 4 cents each, the variation depends on the brand and grade being used.

The price of roller cloth will vary with the quality and the weight from 1 cent per cot to as high as 5 cents per cot.

A good sheepskin roll in a medium coarse yarn mill spinning 12's to 30's should average seven months, double forty-hour shift. After that, on ordinary short draft spinning it may be good for a year in the middle, and after that up to ten years in the back.

The finer the yarn being spun the easier the treatment the roller receives. It is not uncommon for rollers in a fine yarns mill to last two or three years in front, double forty-hour shifts. On such fine work an 8 cent roller would, probably, be used which would give an average annual cost per spindle in the vicinity of 1.5 cents. Then again, mills that keep shifting their counts will consume more rolls than mills that remain on the same count year in and year out.

A calfskin covered roll should average about 1.5 cents per roll more than the best sheepskin. However, calfskin will outwear sheepskin on an avearge of about one-third. Some mills report calfskin will out wear sheepskin three rolls to one.

New developments in spinning machinery have greatly increased the use of calfskin, especially chrome calfskin. The long draft, high speeds and greater twists sometimes requires something stouter than sheepskin, on the front rolls especially.

Chrome calfskin is indisputably superior in cushion and resiliency to bark-tanned calf, and because of the relationship of the mineral tannage to static electricity, spins with little or no "eyebrows."

Another advantage of the bark-tanned calfskin is the ease with which it cements, which practically guarantees a good lap. It is a question, however, whether or not the tendency to "eyebrow" effects the value of the good lap. There are many mills using bark-tanned calfskin with good success, but it must be said that they are content to pick the "eyebrows" for the first two or three weeks, or until this condition is reduced to normal.

(continued on page twenty-three)

"GOSSYPIUM"

By GORDON E. WILLIAMS, '42

Living in the midst of the greatest textile industry in the world, few of us have stopped to study its origin and growth in this country. Although cotton had been grown and used for centuries in other countries, it remained for the United States to give commercial importance to the industry. To meet the demands of a rapidly growing population, this country, as if by the hands of destiny, stepped forward to supply a fibre which so amply supplemented others that, by reducing its initial cost, it has made it possible for practically every man, woman, and child to wear what once was the garb of the favored few.

Introduction And Development Of Cotton Growing

When the first settlers came to this country in 1492, they discovered cotton growing wild, but no effort was made to cultivate it until 1621 when a few enterprising citizens experimented with it in what is now the state of Virginia. The seed of the first cultivated cotton, which probably came from the East Indies, was at first planted only in small patches and confined to domestic uses. It was soon discovered, however, that the soil and climate of Virginia made tobacco growing much more profitable. Other experiments in cotton growing were made in several of the northern states, but the production there never reached very large proportions. It was not introduced into South Carolina until 1783 and into Georgia until the following year. As early as 1741, cotton was grown in Louisiana, for in that year Dubreiul of that locality invented the first machine that would separate the lint from the seed. This was the first big stimulant for the cotton industry.

The early development of the cotton growing industry was unusually slow. It was not until 1739 that the first sample of American cotton was sent to England. A few bags were exported from Charleston in 1747, and in 1753 a citizen of Deleware offered $20 for "the most and best cotton off one acre." Due to the small demand for this fibre, the market price was often less than the cost of growing and preparing it. This was a great drawback to the culture, but the greatest drawback was the scarcity of labor. In 1784, when fifteen bales of cotton were shipped to England, eight were seized in Liverpool as being improperly entered, on the ground that so much cotton could not have been grown in the American colonies. After the Revolutionary War, the development was much more rapid and, in 1791, about 400 bales were exported from the United States.

The invention of the cotton gin by Eli Whitney in 1793 caused a remarkable advance in the industry. Two years after its invention, Mr. James Kincaid, a resident of the present Fairfield county, South Carolina, greatly increased its effectiveness by applying water power to its operation. Later inventions, such as the steam engine and improved presses for baling, tended to increase the industry more and more. The abolition of slavery in the South brought about many radical changes. Big plantations were broken up into small farms and share-cropping and tenant farming came into existance.

The expensive labor which resulted from the Civil War made it advisable and necessary "to make two ears of corn and two blades of grass grow where only one grew before." This condition made the farmer soil conscious and methods of breaking and fertilizing the land were studied and the best were adopted. The intensive system of farming, which involves preparation of soil and rotation of crops, had its beginning in South Carolina in 1857.

Another boon to the industry was the development of railroads in the South. Although there were many navigable streams running through the cotton belt, the early farmers had a great deal of trouble getting their cotton to the market.

Today, because of the favorable climate and the character of the soil, the United States holds first rank in cotton growing.

The Manufacture Of Cotton

In 1738, John Kay, an Englishman, began the series of inventions which were to play such an important role in the commercial prosperity of this country as well as England, by inventing the flying shuttle and introducing it to the woolen trade. In 1760, his son, Robert, invented the drop box and applied the flying shuttle to the manufacture of cotton cloth. Now, the greatest handicap to the industry was the slow, tedious, and expensive process of spinning. Spinners and weavers collaborated on the matter and many experiments were made in an attempt to develop a machine that would spin a hundred or even a thousand threads at one time with only one operator. Such a machine was not invented, however, until 1738, when Lewis Paul, another Englishman, patented a roller machine for spinning.

(continued on page twenty)

THE MANUFACTURE OF TAPESTRIES

BY T. ARNOLD TURNER, JR., '44

As you all know, tapestries are pictures or designs which are made by interweaving colored "woof" or filling threads with undyed warp threads, after the latter has been extended either vertically or horizontally upon a loom. This interweaving is done by means of an instrument known as a "broche" which is neither a shuttle nor a bobbin but works like both of them. Needles are never used in weaving tapestry. Art tapestries can only be woven by trained artists who always interpret and never copy a model. If a slight mistake is made in the process of weaving, there can be no alternative but to destroy what has already been done and start all over again. There is no similarity in hand-woven tapestries and machine-woven tapestries. Every thread of the warp is so completely encased by the filling that warp does not show on either side of the fabric. There are two kinds of tapestries: "haute-lisse," in which the tapestries are woven on an upright loom, and "basse-lisse," in which tapestries are woven on a horizontal loom. This simply means that the warp is stretched like the strings of a harp, usually twenty-two to twenty-six to an inch, but one, the "haute-lisse," has its warp turned vertically while the "basse-lisse" has its warp turned horizontal to the ground. Keep in mind that all of the "real" tapestries are woven by hand. The Gobelin Tapestries, most famous of tapestries, are woven on the "haute-lisse" looms, but the "basse-lisse" looms are about one-third faster than the "haute-lisse."

In high art "haute-lisse" tapestries, well filled with figures of people, the artist weaver can weave only about one squard yard in a year! At the famous Gobelin factories today, this square yard cost about eight hundred and eighty dollars, which does not include taxes, insurance, and salary of the weavers! Nero, the great ruler of Rome, once paid two hundred thousand dollars for a one yard by two yard tapestry. The weaver passes from one color to the other by using the intermediate colors so as to produce a design that looks as if it were painted on the warp. This process is called "hatching the colors," and is the most difficult task in tapestry weaving.

In both "haute" and "basse-lisse," the weaver works on the back side with the finished part facing away from him instead of toward him. The "haute-lisse" weaver has to go around to the front of the tapestry in order to inspect his choice of colors, etc. Neither can the "basse-lisse" weaver inspect his work without going to a great deal of trouble also. The "haute-lisse" tapestries usually bring a higher price because the artistic shading is better than the "basse-lisse" tapestries.

The precautions taken by the weaver to verify the correctness and excellence of his work are of little advantage if he doesn't possess the talent, skill, and experience to insure success in his tapestries. Let it be brought to mind that he uses dry and supple materials which cannot be manipulated as readily as the liquid colors of the painter. He cannot correct, alter, or modify what he has done. Neither can he erase and reproduce it, as the painter. He cannot create harmony of colors except with the difficult task of "hatching" the right colors together; first, in his mind, then, on the warp. Is it any wonder that it takes 12 to 15 years to educate a weaver into all the tricks of the profession? It took several generations of the Gobelin family in France to perfect the art of storied tapestries. Since the design is first drawn on the face of the warp, the weaver reproduces it in the reverse. After the tapestry is finished, no one can tell which is the face of the cloth with the naked eye.

Some of the oldest existing tapestries are no doubt the fragments from the Church of Saint Gereon in Cologne, which were woven in Europe in the 11th or 12th century. The oldest of all existing tapestries was woven in Asia four hundred years B. C. and was found in Crimea. These early tapestries were usually worn on costumes for decorative purposes.

Everywhere they occupied the places of honor. Great Generals carried them to the wars; houses were decorated with them to create warmth and congeniality in the homes.

In France and Flanders, the manufacture of tapestries became nationalized. The most important weavers of France and of the world were the Gobelins. Incidentally, the factory still produces magnificent pieces of art. In 1662 the factory at Faubourg Saint Marcel was purchased by Colbert on behalf of Louis XIV. This manufacture is still carried on by the state.

There are only two museums in Europe devoted to the exhibition of tapestries and textile products exclusively. These are the Gobelins in Paris, and the Crocelta in Florence, Italy. In each museum there are over six hundred or seven hundred pieces of tapestry arranged to show the modifications at different epochs of weaving.

The Editor's Page

ON FRATERNITIES

Freshmen, would you like to become a member of a national honor fraternity? If this is one of your ambitions, now is the time for you to start working, for a good scholastic record is a prerequisite to membership. Also, evidence of high moral character must be shown before a student may be admitted to most of these organizations.

Phi Eta Sigma is the first fraternity into which a Textile student may be admitted. Members are initiated at the end of the first semester of the Freshman year, and again at the beginning of the Sophomore year. In each case, a grade point ratio of 7.5 must have been attained in all previous work. Members of all six schools at Clemson are eligible.

The next honor fraternity that you will wish to join is Phi Psi, the national fraternity of the textile schools and industry, and the organization that most interests textile students. During the first semester of each year, several high ranking Juniors and Seniors are admitted, while during the second semester, some more Juniors and the highest Sophomore in the School of Textiles are tapped. However, grades alone are not enough, as morals and character are also taken into consideration. To become a member of this fraternity, the oldest on the campus, is the desire and ambition of every textile student at Clemson.

At the beginning of your Senior year in college, you may be asked to join Phi Kappa Phi, honor scholastic fraternity with chapters all over the nation. Scholastic standing alone is considered in determining eligibility for this fraternity, a grade point ratio of 6.5 being necessary.

These are the major honors in the scholastic field which await the textile student who is willing to work for them. Members of these fraternities, Phi Psi, Phi Eta Sigma, and Phi Kappa Phi, command respect not only in the whole school, but in later life as well. Therefore, members of the Freshman Class, start now to gain a high grade point ratio, as next spring may be too late. Any effort on your part will be well rewarded.—(E. A. L.)

A SUGGESTION

The Clemson Textile School has gone far. The key note has been progress. Year after year its students have stepped out into the world of industry to make their contribution to a newer and better life. They have upheld the traditions of their fathers in spreading the fame of Clemson far and wide. They have played their part.

Have we played ours? In one way, we have. We have kept up with them to the best of our ability. A mere inquiry will bring from Dean Willis' files the history of any textile graduate's progress from the day of his graduation to the present day. In another way, we have not. We have failed to file or save the masterpieces of work that have been developed during four years of college work. We can not say proudly to our friends, "This article or sample was made by a textile student in 1929." In short, we have no room in which we can display the products of many long hours of work and study. I ask you, "Is that commendable of a school as large as the Clemson School of Textiles?"

It seems to me that this would be a good project for either Phi Psi or the Weaving and Designing Club. It would certainly bring credit to our school to have a room in which the actual products of the student's work could be displayed to new students, old students, visitors, and faculty members. It would certainly be a center of attraction on the campus if carried out successfully.

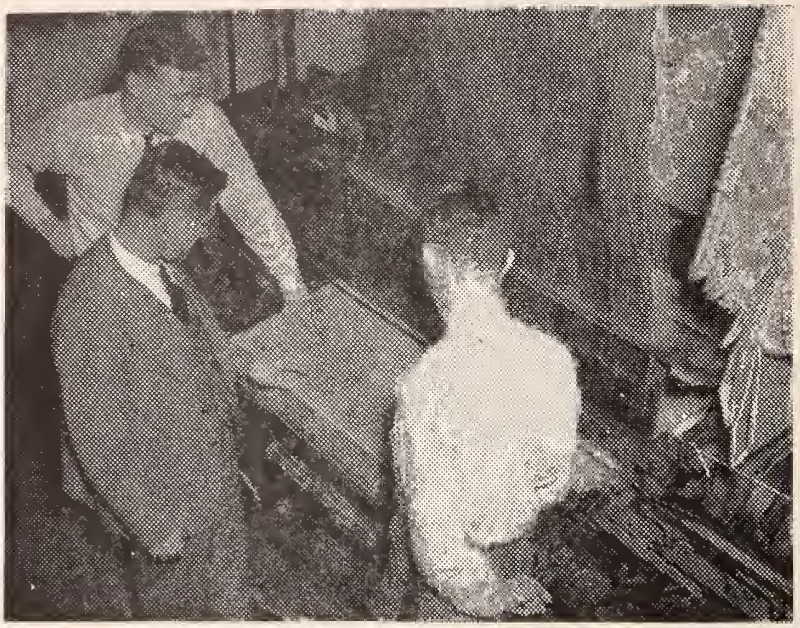
Can't we do something about this? . . . I think we can.—(G. E. W.)

PHI PSI ACTIVITIES

Earlier in the semester, eleven new members, six Seniors and five Juniors, were taken into Phi Psi. The Seniors who were taken in are Ralph Sullivan, A. E. Zeigler, Howard Tarleton, R. L. Cheatham, Bobby Jones, and W. A. Barnette, while Juniors are Lang Ligon, B. A. Chestochowski, Henry Hahn, John Dysart, and J. H. Propst. These boys have completed the third degree of initiation and are now full-fledged members of the fraternity.

The club room has been redecorated, a flag, hat rack, and new curtains being the major additions to the furnishings. Many new records, both popular and semi-classical, have been purchased.

President Jimmie Barton, Theron Hegler, Harry Sturgis, Grady Cash, and Tommy Croxson are performing a very efficient job of leadership in the fraternity, and this year promises to be one of Phi Psi's best at Clemson.—(E. A. L.).



(Left) Prof. McKenna, Bill Gilmore, and Mike Hubbard Examine the Christmas Greeting Sample.

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(Right) Prof. Gage and His Cotton Grading Laboratory.

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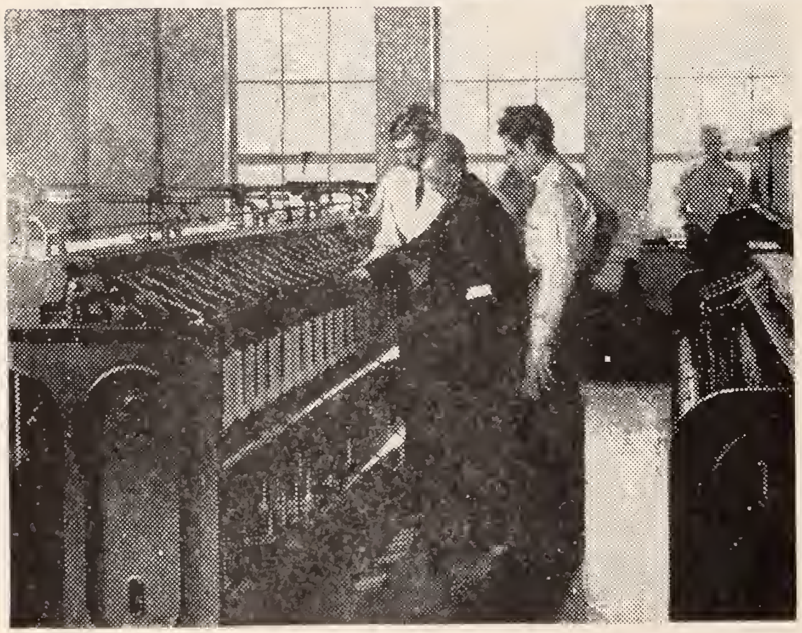

(Left) Prof. Eaton Explains the Fundamentals of the Slubber to His Junior Lab.

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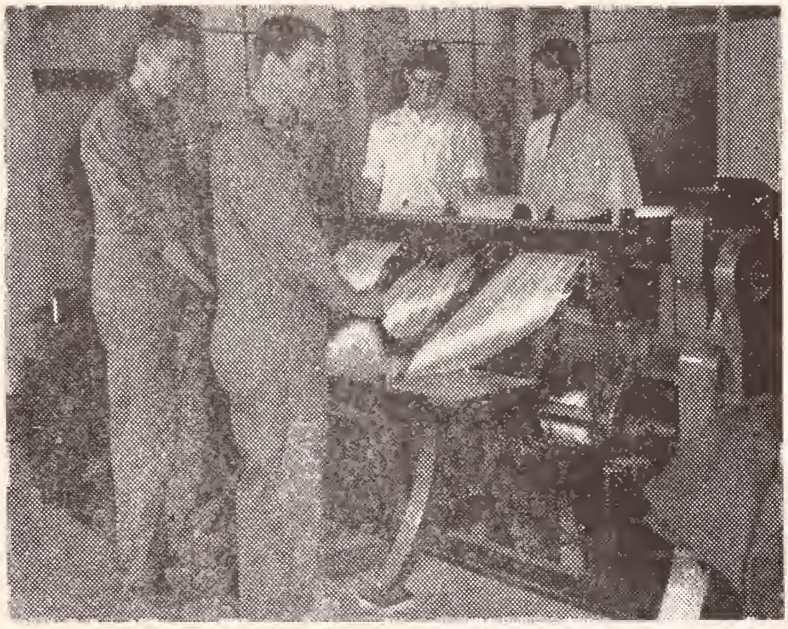
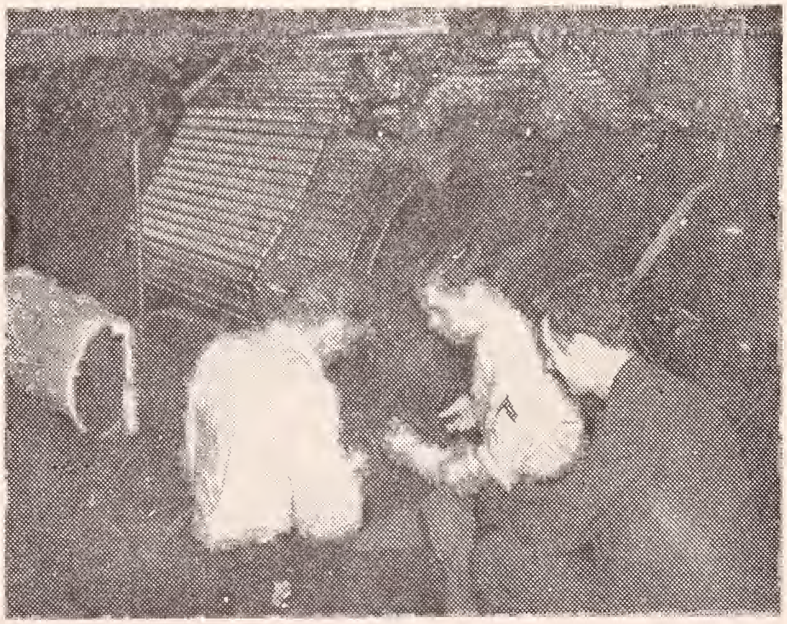
(Right) A Few Freshmen Observe the Sliver Lapper.



(Left) Seniors Learn Their Cost Finding Under Prof. Campbell.

(Right) Prof. Thomson Teaches the Sophomores the Practical Side of Carding.



WHY STUDY MY COURSE?

Editor's Note: Due to the fact that we are prone to think of the subjects directly connected with our textile courses as the only important subjects of our college career, many of us have frequently asked the question: "Why do I have to take that course?" The BOBBIN & BEAKER has passed this question on to various faculty members of other departments, and we now present their answers.

Literature . . . Dr. J. C. Green

The fruits of the study of literature are richer, more varied, and more delectable if, perhaps, less tangible and less marketable than are the fruits of other fields. The more apparent and more easily appraised value of these fruits may be seen in the contribution which they make to the development of personality, one of the most important factors in one's advancement in life. From a study of literature, which in its fullness is a record of the best which has been thought, said, and done, one may derive manners, knowledge of social niceties, knowledge of human nature, forcefulness and charm of expression, worldly wisdom and various experience which will aid him in his struggle to meet his material needs. Such practical values are keenly appreciated today—in fact overemphasized by enthusiasts for subjects other than the humanities. However, the less tangible benefits of the study of literature far outweigh the more tangible ones just mentioned. In the realm of the spirit, one may, in the enjoyment of the golden apples of literature, gain nourishment for the soul; commune with the great minds of the past; gain an emotional outlet and a relief from unpleasant reality; keep before himself the vision of the ideal; and acquire fortitude and a philosophical optimism in times of adversity. If properly presented and studied, literature is, of all subjects, the most cultural and, outside one's professional field, of all subjects the most fruitful.

Steam Power . . . D. H. Shenk

Why should Textile Engineers study Steam Power?

Webster's unabridged defines engineering as "the science and art of making, building, or using engines and machines or of designing and constructing works or the like requiring special knowledge of materials, machinery, and the laws of mechanics." Assuming this definition to be correct it must follow that an engineer is familiar with engines, machines, public works and mechanics. There seems to be no more logical way to become familiar with these subjects than to study them. The course referred to at Clemson as Steam Power is really a course in all kinds of prime movers and their auxiliary equipment. I can think of no division of learning more essential to a professional engineer than that presented in the steam power course for Textile Engineers.

Textile manufacturing requires large quantities of steam which must be produced under direction of the Textile Engineer. The understanding of power plant principles is necessary for any engineer engaged in a professional capacity.

Electrical Engineering . . . L. A. King

A course of study of the fundamentals of Electrical Engineering is important to the student of Textile Engineering from three points of view:

First, that of mental development through a high class of visual and analytical thinking as required by the course.

Second, the practical knowledge of electrical equipment and manipulations with which the practicing Textile Engineers will be concerned.

Finally, the cultural development gained from some knowledge of the electrical quantity which is one of the foundation units of the universe and which is such a vital part of the mechanics of our daily living.

Mechanical Drawing . . . W. W. Klugh

It's the language of the engineer in every engineering profession.

Sociology . . . Frank A. Burtner, Jr.

Each of us lives in a world composed of dynamic groups of various sizes, functions, purposes, and duration. Each of us, by virtue of the fact of birth, is a member of at least several groups and, as a member, one interacts with and is influenced by, be it directly or indirectly, other members. The elements, processes, patterns, and consequences of behavior antecedent or subsequent to this interaction among individuals and between groups is the subject matter of sociology.

Since groups are common to all human life and their influences inescapable, it would seem to behoove each of us to attempt to understand, at least in some measure, the causes, context, and consequences of these relationships. Such an understanding does not make one the absolute arbiter of his fate, but it does enable one to give intelligent direction to his efforts in the process of fitting himself into his community and, thereby, all society.

Mathematics . . . Dr. D. C. Sheldon

Scientific research is rapidly becoming the basis of the modern textile industry. New fibers are being developed, new testing methods are being applied to determine the physical and chemical properties of the fibers in all stages of the manufacturing process, new methods for the treatment of textiles are frequently being introduced, and new ideas relating to weaving are being put through the experimental stages. In short, the whole industry is in a state of flux. This semi-chaotic condition is largely due to the impact of science upon the ancient processes of the textile industry. We can look back over the past twenty-five years and see the effects of scientific research but no one can forsee what revolutionary changes may be introduced in the next quarter of a century.

The qualified textile man must be prepared to understand and use the results of scientific research. A knowledge of chemistry and physics is therefore an absolute essential. Much of the results of chemical research and practically all of the results of physical research are expressed in the scientific journals in mathematical terms. If one wishes to be able to read, to understand, and to use the results of this scientific research and to be able to predict in some small measure what the future may bring to the textile industry, he must have a working knowledge of mathematics. A glance at the scientific journals dealing with textile research will be convincing.

Public Speaking . . . Dr. J. D. Lane

Combine ability to speak effectively with devotion to a good cause and you have a valuable citizen. The textile engineer who can think and speak on his feet in committee meetings, at conventions, at banquets, class reunions, or wherever men gather, will go further than if he had not this accomplishment. Inability to speak in public is a handicap to any engineer who has something worth saying.

Economics . . . Dr. James E. Ward

The study of economics is assuming a place of increasing importance. The disturbed conditions of the past decade or so have greatly enhanced the interest of the general public in economics and economic problems.

Many economic questions are now being discussed on all sides—in the newspapers and magazines, in books, on the public platform, in legislative debates, over the radio, and in private conversation. Therefore, every person in modern times is perforce more, or less concerned with economics. Indeed economic discourse has become so much a part of our everyday life that not only is a knowledge of it necessary to successful business life, but also equally as essential to intelligent citizenship and important from the standpoint of one's general culture. For the student's immediate situation, however, the study of economics not only provides him with a fund of interesting, important, current information, but it impresses upon him the complexity of certain problems which on the surface may appear simple, and enables him to sift the wheat from the vast amount of economic chaff that nowadays finds its way into our newspapers and magazines.

History . . . A. G. Holmes

Technical colleges, such as Clemson, attempt to teach the student a technique, by which he can earn a living or on which he can build a vocation, or a profession. A textile student should get this in his Textile School. And, if the student was out simply to learn a trade, perhaps this would be sufficient.

However, a fair proportion of college graduates never make use of their technique as a means of livelihood. So, in many of the subjects which the student takes, he studies not to master a technique but for mental discipline, or for general cultural background, or for both.

Probably, most, if not all subjects, may be used to develop a technique as well as for mental discipline and general cultural effect. There is a technique for History but, since Clemson makes no effort to train students as writers, or teachers, of History, little attention is given to technique.

A student of History at Clemson, if he really puts out, should develop a critical attitude in judging between fact and fiction, should be able to understand the present the better through a knowledge of the past, should broaden his horizon (and this he sorely needs in this modern, complex industrial society), should learn what is worth preserving of our social heritage and what should be destroyed by reforms, and should develop a broader human sympathy toward men of all nations and of all races. Here is mental discipline, intellectual integrity, broad culture. These are some things, but not all, that History teaches.

Why then should a Textile student, rather than a student of some other technical school, take History? For no reason at all—except that the better engineering schools, such as Clemson, for many years have been insisting (and the tendency is increasing) that their students, as graduates, make better engineers, better citizens, better leaders when they are required to study the so-called social sciences. And this seems to me a good reason for the study of History.

THE HUMAN ELEMENT IN THE COTTON MILL

By L. H. ALLEN, '44

Our generation has seen many changes and improvements made in the manufacturing processes in the textile industry. Improved opening and picking and carding equipment has been introduced; long draft roving and spinning has been perfected; high speed spooling and warping, as well as high speed weaving, is replacing the slow speed processes.

We have seen marked improvement in living and working conditions of the employees. The eight-hour working day, social security, unemployment insurance and other dreams of our fathers have become a reality. Educational facilities for the children of the mill employee have expanded until they are now on a level with the best. Many mills operate or sponsor health clinics for their employees. Group hospital and health insurance programs have been undertaken successfully by most of the mills. Vocational training classes for employees have been organized by the different state and county education boards in cooperation with the mill executive. Numerous other improvements have been made also.

In connection with the improvements in machinery and working conditions, we see also improvements in the management of employees. Many mills have set up personnel departments to select new employees and to hear and study the complaints of the old. Different systems of improving the efficiency of the employee have been introduced into our industry.

With all of these improvements, there still remains before us the fact that a great part of the profits of the industry is still lost and thrown away by the carelessness, indifference, lack of forethought, or sometimes lack of responsibility on the part of the "human element." From the receiving of the raw cotton to the shipping of the finished product, how many dollars of profit go with the wind? In the opening department, a cotton bale buckle carelessly thrown into the hopper may ruin a beater or start a fire in the picker. A careless setting of the evener motion on the picker may cause a loss of production or result in poor quality goods. Poor cleaning and stripping of the cards will have the same effect. Bad end piecing on the fly frames will damage the rolls and cut production and quality in the spinning. Careless roll settings and end piecings in the spinning room are reflected in the cloth. In the weaving department, how many shuttles and bobbins could be saved each year by a little more diligence and care on the part of the loom fixer in setting the transfer motion and picking motion? How many bobbins of dirty filling could be saved by the doffers and battery fillers? How many parts and supplies, as well as losses due to stoppage, could be saved by a little more care in setting the different motions of the machines? How many dollars are lost from the lack of a drop of oil in the right place? In the cloth room, how many feet of baling ties are lost each year because the press man uses a tie two or three inches too long?

These seem to be small items, but they add up to a great amount when taken over a period of time. During the present period of booming industry, we are prone to concentrate more on quantity than on efficiency. In the inevitable days that are to come during the post-war era, we will hear more about and see more done to improve the "human element." A little research will go a long way in improving the "human element" of any mill.

Mr. G. B. M. Walker, Textile Engineering graduate of 1937 and now Assistant Editor of "Textile World," was a visitor at the recent Carder's and Spinner's meeting held at Clemson.

Mr. E. L. Ramey, Textile Engineering graduate of 1931, is Superintendent of the Riverdale Mill in Enoree, South Carolina.

AN OPEN LETTER

DEAR BROTHER RAT:

In this fast-moving world of changing trends and economic crises, there arises, among other important questions, the questions of a college education. Is it worth the time and expense? Does it pay dividends? What does the young man profit from it?

If college is considered to be a gateway to soft positions, if college is a preparation for a country club life, if it is conceived as an open sesame to wealth and political influence—if this be the purpose, college is no longer a success. The boy thinking of college should narrow his thoughts down to one question: "Is there a fundamental need of human society for which college will prepare me?" If there is, he should go to college and work toward that goal. If, in his mind, there is not, he should stay at home, go to work, and save his money.

What is education? The word "education" is derived from the Latin word "educere" meaning to lead forth, to bring forth; hence its meaning is something more than mere receiving and absorbing knowledge. "Knowledge is power," but unused knowledge is wasted power; and wrongly used knowledge is misdirected power, whose effect is destructive rather than productive. Knowledge alone is not wisdom. "Wisdom is the power of knowledge put to productive use."

The object of all education is the same—to build character. Health, scholarship, leadership, and a love for the finer things of life are all traits of character. Character is more than merely freedom from immorality, more than obedience to the Ten Commandments, more than obedience to the laws of society. A good character is a system of refined and reliable traits. It is a character that presupposes the avoidance of such acts as cheating, lying, and stealing, and consists of a positive system of habits involving health, intelligence, sociability, and devotion. A good character is one that may be depended upon in these respects at all times.

Some students seem to have the false notion that character can be assumed when there is a demand for it, and that it lies in great deeds. One or both of these fallacies have wrecked the lives of many potentially great men, for character is not character unless it exists at all times. It is not judged by great deeds, but by the simple actions of our everyday life. Colleges can not make such characters. They can only give the young man the opportunity to do his share.

A person's mind is a personal power; he only can work it. It is made up of three aspects: intellect, will, and feeling. Its capacity for thought is boundless, but it can only hold as much good thought as the person will have it hold. Education of the intellect furnishes knowledge; education of the will furnishes morality; and education of the feelings furnishes culture and refinement. A European visiting this country remarked, "You have no art, and the proof of it lies in the fact that you make a show of what you have." This is a perfect example of the individual. The proof of esthetic development comes, not in flashes, but in the persistence of a natural glow. Art and sentiment are not for the fastidious. The love for these two things aids in making a man a real man.

Recreation is truly a very important part of a college life. Wise use of the recreational period is a great help to a wise use of the study period. No truer words were ever spoken than those of the adage—"All work and no play makes Jack a dull boy." The work of the football player, the golfer, and the swimmer tends to develop the brain as well as the muscle; and that work helps to form a habit of thinking and purposing firmly that can't be obtained in the classroom.

This country, the United States of America, the young man's country, needs more men and women of broad vision who can see beyond the day; something beyond mere culture. She needs men and women who will throw off the heavy burden of selfish interests and dishonest politics; who will help to secure for all mankind an even-handed justice, a justice for all, a justice which will stimulate men to honesty in their own work. She needs men and women who can see that they owe a duty to their fellow citizens.

The young man's education is preparing him for a life after college which will be worth living. He is gaining information and making new friends. He is cultivating a firmness in wisdom of will and purpose that will help him in his everyday life. He is learning to make his thinking aid his work. He is preparing to be a clear-headed, fair-minded, honest citizen, who recognizes the needs of his country. He is learning that there is a deeper meaning to everyday life than just outward appearances. He is learning what it means to be a Christian at heart, in mind, and in life.

College offers you today the keys to the world's

(continued on page twenty-three)

SYNTHETIC FIBER PRODUCTION

BY R. L. CHEATHAM, '42

Synthetic fiber, an important product on the textile and yarn market in the late twenties and early thirties, has developed with such rapid strides in the last decade that it competes with almost unbelievable success with the natural fibers. From a world production of only 457,000,000 pounds in 1930, rayon production has grown to a total of over two billion pounds in 1940. This phenomenal growth constitutes a serious threat to the supremacy of wool, cotton, and silk, the most important of the natural fibers.

This has not come as a result of an overnight invention or some similar act of magic, but is a result of consistent progress made in the research laboratories. It seems to parallel the advancement made in the field of organic chemistry. A better understanding of the cellulose molecule and the more complete utilization of chemical processes on a commercial scale has had an important part in the development of the synthetic fibers. Rayon has ceased to be an imitation of the natural fibers, especially silk, but is now rapidly becoming an individual product with favorable properties and advantages which make it more valuable to the consumer. Many of these fibers can be processed more simply and less expensively than the natural fibers.

The inability of manufactures to get raw silk has necessitated the substitution of synthetic fibers in fine goods and in sheer hose. The present rayon fibers will not satisfactorily replace silk, but it will be replaced by vinyon, nylon, or some yet to be developed fiber. In the lingerie products, silk will be replaced last, and it is in this field, if at all, that silk will come back after the present war.

Leading the gains in synthetic fibers is rayon staple fiber with an almost unbelievable increase of production from 6,250,000 pounds in 1930 to 1,236,850,000 pounds in 1940. The continued rapid growth is shown by an increase of 154,855,000 pounds in the year 1939 alone. This advance can be attributed to the production of a better grade of staple fiber, more successful adaption of the regular cotton machinery to carding and slashing of the spun rayon, the added experience in bleaching and dyeing the synthetics, introduction to the market of longer staple fibers, the delustering of the fiber which enables their use in ordinary cotton goods, and other developments. The fact that we are becoming more efficient in handling the fibers everyday gives reason to believe that this growth will continue. A few years ago, the finishing plants could not cope with the problem of bleaching and dyeing the rayon products that were sent to them for processing, but this handicap is being overcome rapidly. Another important reason for the success of staple rayon fibers is their ability to be mixed; that is, the fibers made by the different processes can be mixed, one with the other, and the synthetic fibers can be mixed with the natural fibers. This produces a desirable and sometimes novel effect in the finished product. The adaption of synthetic fibers to felting and knitting has increased the consumption of the staple fiber.

Synthetic fibers were first produced in Europe and were developed there, until, in the twenties, production was started in this country on a sizeable scale. The industry in the United States has grown as rapidly as in Europe since the turn of the decade. From 1930 to 1940 the total rayon production in the country increased 343,485,000 pounds. This does not quite parallel the increase in Japan and the countries of Europe but the obvious reason is that, since this is the home of cotton, cotton is more accessible to the manufacturers; while these foreign powers must import this natural fiber. These countries began the development of synthetic fibers with the object of reducing, if not eliminating, the dependence upon importation from other countries of the natural fibers.

This early lead in rayon production taken by the European countries caused the United States to import a large part of her staple fibers and filament yarns from them. In 1930, we imported 7,941,706 dollars worth of rayon. In 1937, our importations amounted to 9,522,095 dollars, and in 1939 to 11,847,375 dollars. This shows a steady increase in rayon importations, but this increase is very small when compared with the increase in total rayon consumption in this country. In 1940, our rayon importations dropped over 50 per cent. This can be explained partly by the war conditions preventing export from Germany, and partly by the increased domestic production. The importations from Germany and Italy have become almost negligible; but England, with an eye toward salvaging this country as a customer after the war, and in an effort to keep her imports from becoming too much out of balance with her exports, is rationing her home consumption. The difficulty in getting rayon from Europe is forcing the domestic producers to increase

(continued on page twenty-one)

SOMETHING ABOUT OUR FACULTY

BY M. D. MOORE, JR., '43

D. P. Thomson

Mr. Thomson was graduated from Clemson College in 1927. He immediately began working with the Dunean Mill in Greenville as weaver and installation man. After two years at Dunean, Mr. Thomson accepted a position as textile instructor on the faculty of the Wellford-Lyman-Tucapau consolidated school at Tucapau where he remained for two years. Upon leaving Tucapau, he became a member of the faculty of the textile department of the Parker High School in Greenville, South Carolina. He held this position until the summer of 1941 when he was appointed to succeed Mr. G. H. Dunlap, now on leave from the Clemson Textile School for one year.

Mr. Thomson is a charter member of Phi Psi, and was one of the organizers of the fraternity here. He is also a member of Iota Lambda Sigma, national honorary Industrial Education fraternity. We are very glad to have Mr. Thomson on the Textile School faculty and we wish for him a very bright future at Clemson.

E. P. Ward

Mr. Ward received his diploma from Clemson College in 1937. Immediately upon graduation, Mr. Ward accepted a position as Laboratory Assistant with Ciba Company, Inc., in New York. After serving in this capacity for one year, Mr. Ward returned to South Carolina to accept a position with the Gregg Dyeing Company of Graniteville. He remained with this company for three years, and held several positions while there. At the time he was appointed a member of the faculty of the Clemson Textile school, Mr. Ward was foreman over dyeing.

Mr. Ward is a member of Phi Psi, national honorary Textile fraternity. He has been appointed to fill the position of Mr. W. L. Hicks, now a First Lieutenant in the Quartermaster Corps, United States Army.

Gaston Gage

Mr. Gage was graduated from Clemson College in 1921. Since that time he has held numerous positions of major importance in the textile industry. Immediately upon graduation from Clemson, Mr. Gage began work in the Aragon-Baldwin mill at Chester, South Carolina, as card and frame hand. Other positions held by Mr. Gage in the Aragon-Baldwin Mill include: Loomfixer, Weave Room Second Hand, Cloth Room Overseer, Card Room Overseer, Spinning Room Overseer, and Paymaster.

After eleven years with the Aragon-Baldwin Mill, Mr. Gage accepted a position on the faculty of the Clemson Textile School as Instructor of Carding and Spinning. Mr. Gage once obtained leave of absence from his duties of teaching to conduct work in flax research. Mr. Gage is a member of Phi Psi, national honorary textile fraternity. He received his Master Degree in Education at Pennsylvania State College in the summer of 1941. He is well liked by all students who know him and by all men who have studied under him; he is "tops" in the eyes of his two young sons who attend grammar school at Calhoun.

I. S. Pitts

Mr. Pitts was graduated from Clemson College in 1929. He at once accepted a position with Draper Corporation at Hopedale, Massachusetts, where he held a position in the shop and erection department. After three years there, Mr. Pitts resigned this position to take over the position of Weave Room Second Hand at the Muscogee Manufacturing Company in Columbus, Georgia. He was soon promoted to Weave Room Overseer at the same plant. He had held this position for four years when he resigned to accept the position of Weave Room Overseer at the Martell Mill in Asheville, North Carolina. After a short while with this company, Mr. Pitts accepted the position of Assistant Superintendent of the Southern Brighton Mill in Shannon, Georgia. While holding this position, Mr. Pitts was forced to quit work because of an injury. After a period of rest and recuperation, Mr. Pitts accepted a position on the faculty of the Clemson Textile School. He began teaching here in the fall of 1940.

While a student at Clemson, Mr. Pitts was very active in worthy student organizations. He is a member of Phi Psi, national honorary Textile Fraternity. Mr. Pitts is well liked in the classroom as well as on the campus, and in the eyes of the textile student, is a "regular fellow."

"GOSSYPIUM"

(continued from page nine)

Although this machine was invented thirty years before Arkwright invented his machine of similar nature, it never was a success largely due to the lack of experience in the owners.

Mr. Paul made another contribution to the industry when, in 1748, he invented the rotary card. Hitherto, carding had been accomplished with stock cards. This machine, together with John Lee's feeder, greatly improved cotton carding.

Around 1764, James Hargreaves, a poor weaver of Lancashire, England, discovered the principle of the spinning jenny, which he later developed, by the accidental overturning of a spinning wheel. He kept his invention a secret at first, but it was soon discovered and destroyed by a mob who feared that the machine would do away with their jobs. Hargreaves fled to Birmingham and, in 1770, obtained a patent for his jenny. Its importance was immediately recognized by manufacturers and several were put into use. Again, the laboring class revolted, destroying the jennies in that part of the country.

In 1769, Richard Arkwright patented his roller spinning frame and soon put it into production. He soon made a fortune off of the machine which had failed to attract public notice when invented by Lewis Paul only thirty years previously.

These inventions, together with Samuel Crompton's spinning mule, which superseded the spinning jenny, had done much to speed up the manufacture of cotton. With the development of the steam engine and the power loom, the cotton industry continued to grow and expand.

Around 1788, Samuel Slater brought much valuable knowledge of English machinery, which was being held under embargo in England, to this country. He soon entered into partnership with Almy and Brown of Providence and began working on a series of machines after the Arkwright pattern.

The only remaining obstacle to the cotton industry was the lack of raw material. This was overcome, in 1793, with the invention of the saw gin, which made it possible to clear the fiber of seed rapidly. To the relief of manufacturers and planters alike, the market was soon flooded with cotton and cotton mills began to spring up over the country.

The dreams of great inventors were rapidly realized, and such inventions as the power loom, the warp stop motion, the filling stop motion, automatic bobbin changers, the Dutcher temple, and the dobby loom have given the industry the highest standing in the world of commerce and industry: for, today, no one article of manufacture so controls and dominates the prosperity of the world as does the product of the wonderful plant "gossypium."

G. H. DUNLAP

BY M. D. MOORE, JR., '43

Mr. G. H. Dunlap, on leave from his duties as professor in the Clemson Textile School, is now employed to establish and supervise research in cotton mills wherever his services are desired. His work is supervised by the Southern Textile Association and the Arkwrights. The Textile Foundation of Washington, D. C., is financing the research to the extent of $5,000 per year.

Mr. Dunlap calls on mills where a test is wanted. He finds out the nature of the test and immediately lays out a form of the test. He then selects men in the mill who wish to help carry out the test. He presents these men with the form of the test and leaves the men to conduct the test. He then endeavors to have the same test made in other mills, so as to eliminate errors due to conditions peculiar to one mill.

Thus far, Mr. Dunlap has been very successful in his new work and is progressing very rapidly. He has begun tests in many mills in Virginia, North Carolina, and South Carolina. Some of the tests which are now under way in mills throughout this section include:

1. A test on long draft roving with various roll settings and the effect of these settings on the yarn.
2. A test on drawing frames using various types of top rolls.
3. A test on drawing frames using a combination of roll settings and the effect of these settings on the yarn.
4. A test on conventional draft spinning running a self-weighted top roll or slip roll and using a combination of roll settings.
5. A test on the slasher to determine the proper temperature on the cylinders, its effect on drying the yarn, and to determine also the number of yards slashed per minute.
6. A test on mill laboratories with standard conditions as compared with laboratories without temperature control.
7. A test to study the effect of blending reserves on picker laps made on one process pickers.

These are only a few of the tests begun by Mr. Dunlap since he entered upon his duties in the summer of 1941, after completing thirteen very successful years at Clemson.

Mr. Dunlap's new address is Walhalla, South Carolina, but he may be contacted also at the Clemson Textile School to which he often returns to carry on the research connected with his new position. Any persons interested in making a test should contact Dr. Dunlap. His services are available without charge.

Annual Carder's And Spinner's Meeting

BY M. D. MOORE, JR., '43

The annual Carder's and Spinner's meeting was held in the Auditorium of the Textile Building at 10:00 A. M., November 15, 1941. Mr. W. W. Splawn, Chairman Carder's Division presided over the meeting.

In the absence of Dean H. H. Willis, Mr. R. K. Eaton of the Clemson Textile School faculty introduced Dr. R. F. Poole, President of Clemson College, who delivered the Welcome address to the visitors.

Dr. Poole stated that much progress had been made toward securing new equipment for our Textile Department. He also expressed his desire for more research in textile mills of this area and in our Textile School at Clemson.

Dr. Kinard, President of Newberry College, was scheduled to speak but could not attend the meeting because of an injury received in an automobile accident. Judge J. S. Thurmond, of Edgefield, delivered an address on a very timely and interesting topic, "Things Worth Fighting For." He stated that "the clarion call of today is production" and urged the mill men of South Carolina to cooperate to increase production. He closed his address by reciting a very inspiring poem of patriotism.

After a speech by Mr. J. C. Cunningham of the Kindall Corporation, Mr. Cunningham answered several questions concerning problems of salvaging materials, the topic of his talk being "Salvage." One of the questions which brought about much discussion and thought follows:

> "Has anyone developed a definite salvage program in anticipation of breakdowns or faulty running of machinery? If so, what is it?"

This open discussion was followed by a short talk by Mr. G. H. Dunlap in which he told the group the nature of his new work of supervising tests in mills in South Carolina and surrounding states. He also made the statement that he is available when needed to begin tests in any mill. He told of one test that he is conducting in several mills at the present in which the speed of the card is increased. Results of his tests clearly show the marked increase in production and the increase in the breaking strength of the yarn produced from the sliver obtained. Mr. Dunlap, in answer to questions, told of conditions of the card room floor and the type of cotton used where this specific test was conducted. Other questions and Mr. Dunlap's answers follow:

> Q. Is the sliver properly carded with this increase in the speed of the card?
>
> A. Mr. Dunlap answered affirmatively by reading to the group the waste results of his tests in two different mills.
>
> Q. Were the settings of the flats changed?
>
> A. Mr. Dunlap replied negatively.

After questioning Mr. Dunlap, the group entered into an open discussion of general mill problems and the methods used in solving these problems economically and efficiently.

The local chapter of Phi Psi, National Honorary Textile Fraternity, cordially invited the group to use the Club Room as their headquarters over the weekend. The members of Phi Psi acted to the best of their ability to make the weekend a very enjoyable one for the Alumni and other visitors.

Synthetic Fiber Production

(continued from page eighteen)

their plant capacities and to erect new and larger plants in order to meet the demand in this country.

Under the present conditions the imperalistic countries are unable to purchase cotton, wool, and silk in any appreciable quantities and are turning to the synthetic fibers to relieve this scarcity. The total amount of synthetic fiber produced in these countries cannot be accurately determined but it is believed that the production in Germany, Italy, and the occupied countries has not been decreased and, if anything, has increased. This is a gain for rayon when the fact that manpower, research efforts, and other essentials are being concentrated on the production of munitions and armaments.

In the future, the production of rayon will probably grow by leaps and bounds. It has been predicted that by 1950 the rayon production will be about 25 or 35 per cent of the total fiber consumed as compared with only 10 per cent in 1940. Viscose, the most successful synthetic fiber at present, will not gain as much as acetate and the protein fibers. The picture of rayon in the future is a bright one.

Where Some Of Our Textile Graduates Are Located

R. T. Osteen, Textile Chemistry graduate of 1941, is now a Second Lieutenant in the United States Army. Mr. Osteen is stationed at Fort Jackson.

T. M. Champion, Textile Engineering Graduate of 1940, is Overseer of Carding with The Marion Manufacturing Company of Marion. North Carolina.

W. C. Blakeney, Textile Engineering graduate of 1931, is Overseer of Spinning with the Springs Cotton Mills of Fort Mill, South Carolina.

P. J. Burns, Textile Engineering graduate of 1940, is now Lieutenant in the U. S. Army, and is stationed at Fort McPherson, Georgia.

S. M. Bush, Textile Chemistry graduate of 1941, is now connected with the Hercules Powder Co., Wilmington, Delaware.

L. S. Duval, Weaving and Designing graduate of 1936, is assistant Manager of the Ranlo Mfg. Co. (Burlington Group), Gastonia, N. C.

J. L. Edmonds, Textile Engineering graduate of 1941, is now in the Quartermaster Corps, United States Army.

W. C. Gilmore, class of '13, is now overseer, designer, Dunean Mills, Greenville, South Carolina.

A. D. Graham, Textile Chemistry graduate of 1940, is now a Lieutenant in the U. S. Army, and is stationed at Fort Jackson, S. C.

G. W. Kirby, Textile Engineering graduate of 1941, is now in the Quartermaster Corps, United States Army.

R. B. Smith, Jr., Textile Engineering graduate of 1930, is now Supervisor of Spinning, E. I. duPont de Nemours,, Inc., Charlotte, North Carolina.

J. E. Simkins, Jr., Textile Engineering graduate of 1939, is now a Lieutenant in the A-Medium Tank Regiment, U. S. Army, Fort Knox, Kentucky.

A. S. Sanders, Weaving and Designing graduate of 1938, is now a Lieutenant in the U. S. Marine Corps.

B. S. Rose, Textile Engineering graduate of 1931, is now Assistant Superintendent, Dunean Mills, Greenville, South Carolina.

WANTED: MEN

(continued from page three)

job, change from textiles today. When you start in a mill, you will probably be put to work cleaning looms, not only to give you an opportunity to learn but to see if you can "take it." The only way for you to "know" a job is to have run that job yourself, it gives you confidence and also a sense of justice to have worked in the more menial positions.

What about character? How are my morals? More supervisors in the textile industry have fallen by the wayside from "wine, women, and song" than for any other reason. You must command respect to be a leader. A man may get by on his energy and brain until he is forty-five, but then men are wanted for their character and experience.

When you become the manager of a mill, remember you are working for three groups. You are working for the stockholders of the mill, and you are the trustee and guardian of their property. You are also working for the employees in your mill. It is your duty to see that they are not imposed upon and that they get a square deal. You must also keep their jobs competitive; because if you do not manage the mill well, keep waste down, and give people jobs comparable with other mills, your people will be thrown out of work because of your negligence. You should keep your mill competitive in equipment; the day has passed when a "flying machine" can compete with a dive bomber. And third, you are working for the public. If you can make goods at the lowest cost, you can guarantee the public will be at your doorstep buying. Edison could have charged $10 apiece for his electric lights, but he did the world a service when he produced them at a reasonable cost to all.

And just as the world needed men ten, twenty-five, or fifty years ago, so it needs them today. As you walk along the street, you can see posters which state: "Uncle Sam needs **you**." And he does need you—in industry, farms, and professions. We have tried to tell you a few of the things he need **in** you. And remember this, fellows, when the world seems tough and you feel you haven't a chance—just put this in your pipe and smoke it: "There are more good jobs than there are good men to fill them."

Mr. Richard A. Martinell, Textile Chemistry graduate of 1940, is now a chemist in the Dye Department of the Baker-Camak Hosiery Mill in Burlington, North Carolina.

CLEMSON TEXTILE SCHOOL

Clemson Textile School moved into its new plant in September, 1938. This new building cost approximately $475,000, and has 127,000 square feet of space.

Clemson, having 353 students, has the largest four-year day enrollment of the ten textile schools in the U. S.

According to the records of this office the textile students are located in states per the attached. No doubt many of those in the column marked "Doubtful" are in textiles or allied industries.

During the past ten years, approximately 95 per cent of the textile graduates have gone into textiles or allied work such as teaching textiles, textiles sales, etc.

The enrollment has grown from some four or five students in 1893 to a present enrollment of 353. In addition to this number, we have about ten students taking special textile work, making a total of 363 students.

Since the compiled figures in the table below do not include the graduates of 1941 and do not take into account the changes due to military conditions, there have probably been some slight changes in the status of the Clemson graduates.

	Clemson Textile Men			
	In Textiles	Non-Textile	Doubtful	Total
Alabama	14	1	5	20
California	1	1	----	2
Connecticut	1	----	1	2
Florida	----	4	2	6
Georgia	65	3	14	82
Illinois	3	----	----	3
Japan	----	----	1	1
Kentucky	----	1	1	2
Maryland	3	3	----	6
Massachusetts	5	----	----	5
Michigan	1	----	----	1
Mississippi	----	----	1	1
New Jersey	----	----	1	1
New York	18	3	2	23
North Carolina	98	6	14	118
Ohio	1	----	----	1
Oklahoma	2	----	----	2
Pennsylvania	8	3	1	12
Phillipine Islands	----	1	1	2
South Carolina	291	85	177	553
Tennessee	9	1	----	10
Texas	5	1	----	6
Virginia	12	3	----	15
Washington, D. C.	3	1	----	4
Total	540	117	221	878
Per cent	61.503	13.325	25.170	99.998

AN OPEN LETTER

(continued from page seventeen)

library, a standard for the appreciation of other men's work, a host of new friends, the chance to learn manners from students who are gentlemen, and the chance to form character under professors who are cultured. You have done some hard thinking. You have taken yourself seriously. The world is yours. What are you going to make of it?

Sincerely yours,

THE EDITOR.

CORK VS. LEATHER ROLLS

(continued from page eight)

It is possible that there are some mill executives who will find that their costs do not compare favorably with the figures given here. Some will have better figures. Our advice to the former executive is not to jump to conclusions too quickly but to consider every point carefully. He should consider his cotton, his manufacturing machinery and methods, his counts, the skill and attitude of his operatives, as well as his roller-covering materials. Each has some weight in the final results.

Mr. W. E. Dunn, Textile Engineering graduate of 1938, is Assistant Superintendent of the Chiquola Manufacturing Company in Honea Path, South Carolina.

Mr. W. B. Harry, Textile Engineering graduate of 1938, is Assistant Superintendent of Minette Mills in Grover, North Carolina.

Mr. R. B. Fuller, Textile Engineering graduate of 1940, is Textile Designer with The Springs Cotton Mills in Lancaster, South Carolina.

Mr. W. J. Erwin, Textile Engineering graduate of 1921, is Vice-President of the Republic Cotton Mills in Great Falls, South Carolina.

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Remove Starches

by gentle, natural action

* * * * * * * * * * * * * * *

DESIZE
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OFFICIAL JOURNAL OF THE CLEMSON TEXTILE SCHOOL

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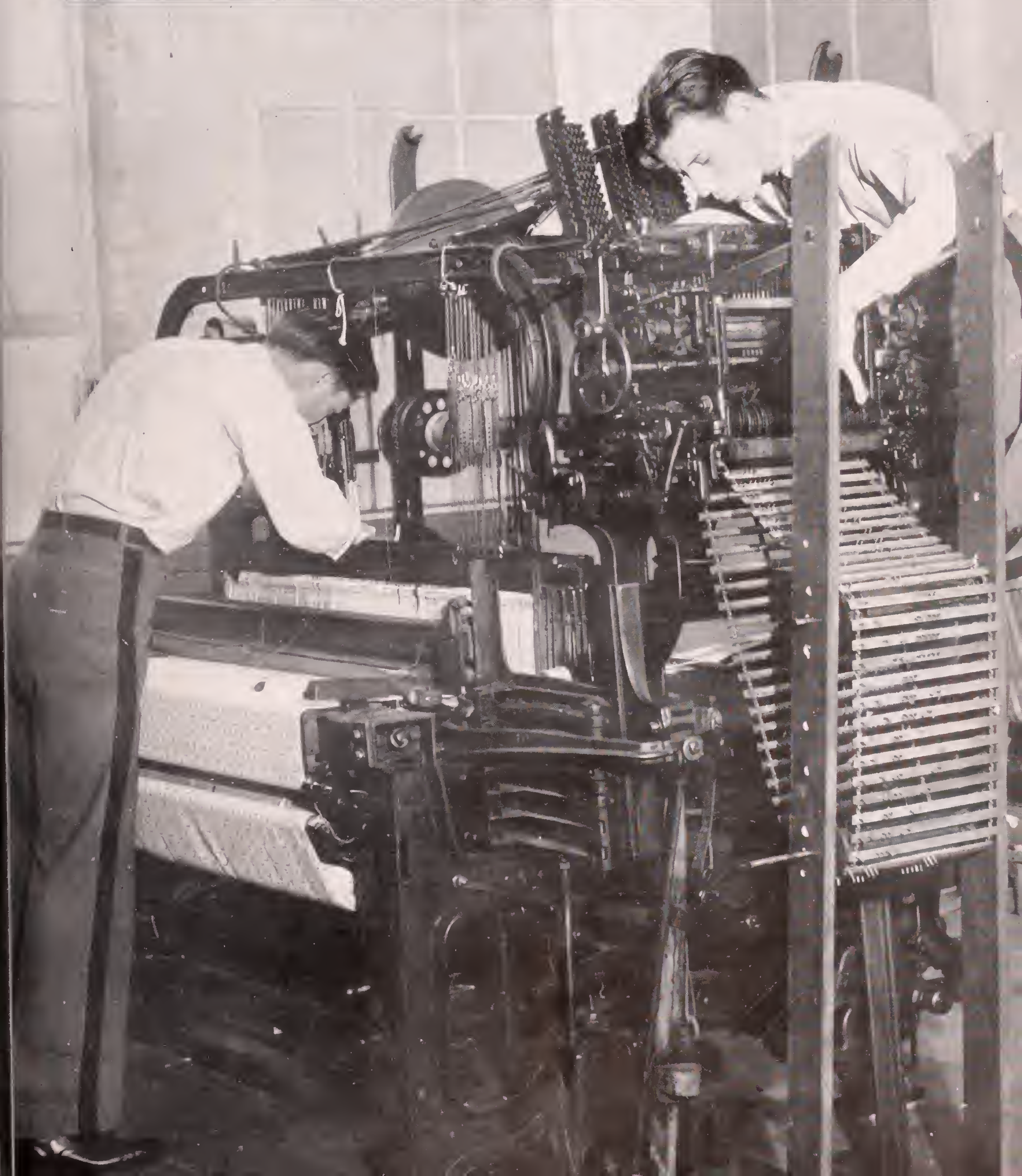

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OFFICIAL TEXTILE STUDENT PUBLICATION OF CLEMSON A. AND M. COLLEGE

VOLUME II JANUARY 1941 NUMBER 1

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Cover Photo by R. G. HUFFORD

In Memorium

Dr E. W. Sikes

MAY 1868 JANUARY 1941

Useful Data

To find circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find area of a circle multiply square of diameter by .7854.

To find area of a triangle multiply base by one-half perpendicular height.

To find surface of a ball multiply square of diameter by 3.1416.

To find solidity of a sphere multiply cube of diameter by .5236.

To find cubic inches in a ball multiply cube of diameter by 5236.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U. S. standard) weighs 8 pounds, one-third ounce, and contains 231 cubic inches.

A cubic foot of water contains 7 1-2 gallons, 1,728 cubic inches, and weighs 62 1-2 pounds.

To find the pressure in pounds per square inch of a column of water multiply the height of the column by .434.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 pounds to the square inch).

A standard horse power: The evaporation of 30 pounds of water per hour from a feed water temperature of 100 degrees F. into steam at 70 pounds gauge pressure.

To find capacity of tanks any size; given dimensions of a cylinder in inches, to find its capacity in U. S. gallons: Square the diameter, multiply by the length and by .0034.

To ascertain heating surface in tubular boilers multiply two-thirds the circumference of boiler by length of boiler in inches and add to it the area of all the tubes.

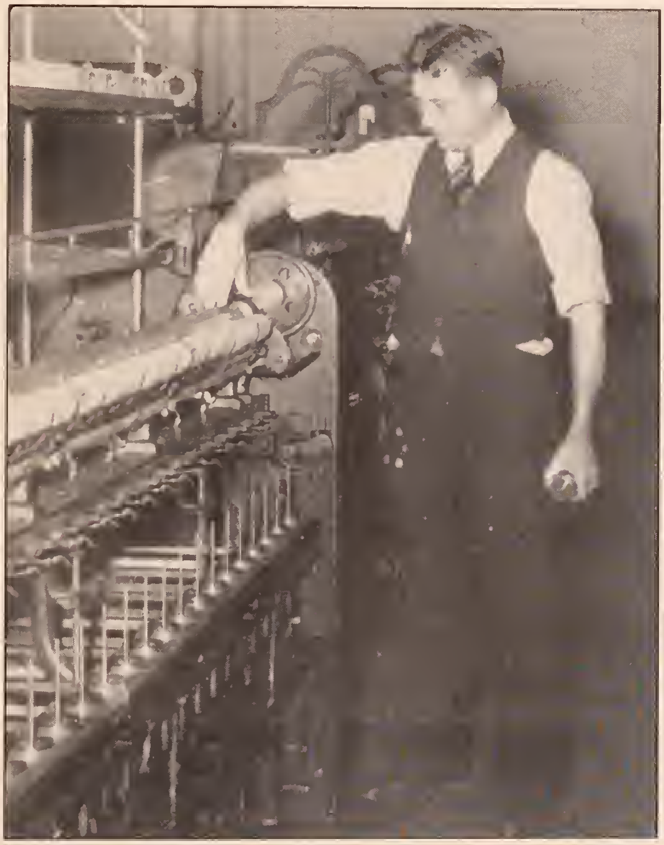
One-sixth of tensile strength of plate multiplied by thickness of plate and divided by one-half the diameter of boiler gives safe working pressure for tubular boilers. For marine boilers add 20 percent for drilled holes.

Millimeters × .03937 = inches.
Millimeters ÷ 25.4 = inches.
Centimeters × .393 = inches.
Centimeters ÷ 2.54 = inches.
Meters × 39.37 = in. (Act Cong.)
Meters × 3.28 = feet.
Meters × 1.094 = yards.
Kilometers × .621 = miles.
Kilometers ÷ 1.6093 = miles.
Kilometers × 3280.7 = feet.
Square Millimeters × .055 = sq. in.
Square Millimeters ÷ 645 = sq. in.
Square Centimeters × .155 = sq. in.
Square Centimeters ÷ 645 = sq. in.
Square Meters × 10.764 = sq. ft.
Square Kilometers × 247.1 = acres.
Hectars × 2.47 = acres.
Cu. Centimeters ÷ 16.387 = cu. in.
Cu. Centimeters ÷ 3.69 = fl. drs. (U. S. P.)
Cu. Centimeters ÷ 29.57 = fl. ozs. (U. S. P.)
Cu. Meters × 35.314 = cubic feet.
Cu. Meters × 1.308 = cubic yards.
Cu. Meters × 264.2 = gallons (231 cu. in.)
Litres × 61.023 = cu. in. (Act Congress.)
Litres × 33.84 = fluid oz. (U. S. P.)
Litres × 2642 = gals. (231 cu. in.)
Litres ÷ 3.78 = gals. (231 cu. in.)
Litres ÷ 28.317 = cubic feet.
Grammes × 15.432 = grains. (Act Congress.)
Grammes ÷ 981 = dynes.
Grammes (water) ÷ 29.57 = fl. oz.
Grammes ÷ 28.35 = oz. avoirdupois.
Grammes per cubic cent. ÷ 27.7 = lbs. per cu. in.
Joule × .7373 = foot pounds.
Kilo-grammes × 2.2046 = pounds.
Kilo-grammes × 35.3 = oz. avoirdupois.
Kilo-grammes ÷ 1102.3 = tons (2000 lbs.)
Kilo-grammes per sq. cent + 14,223 = lbs. per sq. in.
Kilo-gram metres × 7.233 = ft. lbs.
Kilo per metre × .672 = lbs. per ft.
Kilo per cubic metre × .026 = lbs. per cubic ft.
Kilo perr Cheval × 2.235 = lbs. per H. P.
Kilo-Watts × 1.35 = Horse Power
Watts ÷ 746 = Horse Power.
Watts ÷ 737 = ft. lbs. per second.

The Development Of The Textile Industry In South Carolina

By PROFESSOR G. H. DUNLAP

The history of cotton manufacturing in South Carolina involves a great deal more than is shown by the statistical record of its growth. Progress from the pioneer plants to the present commanding position of the industry cannot be traced by a mere recital of figures. To properly visualize this development, we must take into account the economic conditions prevailing when the first mills were started and the various influences which both aided and checked their growth. The story, too, must contain something of the spirit of reconstruction days—of the vision of the leaders of that period who foresaw that the South could find salvation only in the strength of her own efforts to build again an economic structure that would support her people.



Professor G. H. Dunlap

To you who are prone to think of the textile industry in South Carolina as a new enterprise resulting from the effects of the Civil War or to those who hold the popular misconception that the textile industry has been transplanted from a parent New England, the history of the development of textile manufacturing in South Carolina should be most interesting.

Perhaps they are apt to remember the complete and picturesque plantation system that existed in this state, where slaves sometimes made the coarsest cloth for their own clothing, and to forget that in the humble homes a majority of the white population lived many a Silas Marner whose heritage in old England has been the skilled craft of manufacturing yarns and fabrics.

It is admitted on all sides that South Carolina has the distinction of being the pioneer in the development of the textile industry in the Southern States. Historically, we believe that cotton manufacturing on a machine basis in South Carolina began in the year 1790 Yet we have recorded in the records, that Governor Glenn of South Carolina in the year 1748 stated in a required report to the English Lords of Trade that the Carolina colonists were manufacturing cloth goods for home consumption.

It is only just and fair to concede to Slater the distinction of going into the cotton mill in a business-like manner, but the claim that the first mill was erected at Beverley, Mass., in 1787 is questionable, and the distinction of having the first mill most probably belongs to South Carolina.

In Gregg's "History of the Old Cheraws" the following reference, from a Charles Town Gazette of December 22, 1768, establishing the fact that cotton goods were made in this state as early as 1768.

> "A gentleman of St. David's Parish, in this province, writes to his correspondent in Charles Town: 'I expect to see our own manufacturers much promoted in this part of the province. I send you some samples of what hath been already done upon this river in the parish. The samples of white cotton was made in proportion of twelve yards to one pound of cotton. Flax, hemp, and cotton may be raised here in any quantity. As to wool, one can not have much of it."

We have records of an eighty-four spindle mill that was situated on the Santee River near Statesburg in Sumter County. It was operated by a small band of English spinners and weavers, and who knows but what the gentleman from St. David's Parish was referring to the small enterprise? It is also stated in the Gazette of March 2, 1769:

> "Many of the inhabitants of the northern and eastern parts of the province have this winter clothed themselves in their own manufactures; many more would purchase them if they could be secured."

In 1770 there seems to have been a general movement toward developing the state along manufacturing lines, and a committee was appointed to establish and promote manufacturing in the province, with Henry Laurens, Esq., as chairman and treasurer of the organization. Petitions were circulated for the raising of money and considerable funds were secured for the promotion of the industry.

Daniel Heyward, the father of Thomas Heyward, Jr., who was one of the signers of the Declaration of Independence from South Carolina, stated in a letter to his son dated February 19, 1777:

> "My manufactory goes on bravely, but fear the want of cards will put a stop to it, as they are not to be got; if they were, there is not the least doubt but that we could make six thousand yards of cloth in the year from the time we began."

On the 13th day of March, 1789, Hugh Templeton deposited in the office of the Secretary of State two plans of inventions. One a complete draft of a card machine that would card eighty pounds of cotton per day and the other a complete draft of a spinning machine, with eighty-four spindles, that would spin ten pounds of yarn per day and only required one attendant to operate the machine.

In 1795, the General Assembly of South Carolina passed an Act that a lottery be drawn and the profits used for manufacturing, as a result of which four hundred pounds were entrusted to William McClure to erect a factory to manufacture Manchester wares, provided that he employ and instruct seven white persons for a period of seven years.

The South Carolina Homespun Company of Charleston was organized in 1808 and was considered the most important undertaking in the cotton mill industry up to that time. In 1808 the fad for wearing homespun became so acute that the house of representatives of South Carolina passed a resolution that all members of the General Assembly should appear during the session clad in homespun suits.

The first mills in South Carolina were, for the most part, built in the coastal section of the state on small water powers, but after the war of 1812 had centered attention on the question of home industry, the colony spread out into the water powers of the Piedmont section, now the true textile Alsace-Lorraine of the United States.

It is surprising to learn that many of the outstanding men, noted for leadership, were opposed to the cotton mills, in their economic development of South Carolina. Jefferson was bitterly opposed in his early days to the cotton mills, and John Randolph said:

> "The mills in the South would bring yellow fever, not in August, but from June to January, and from January to June."

John C. Calhoun expressed his sentiment with the following words:

> "It is better for us that our cotton should go out in yarn and goods rather than in the raw state."

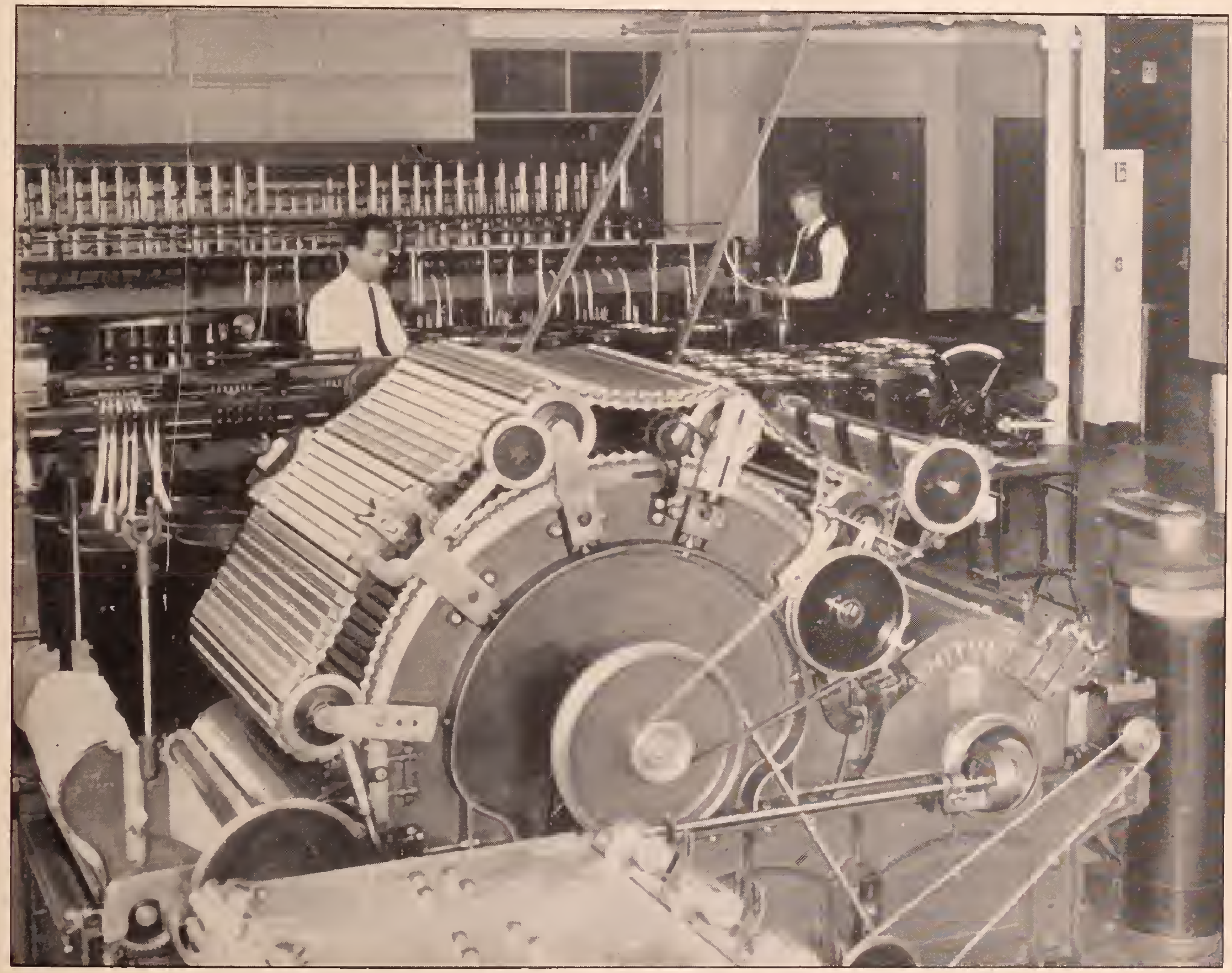
About 1816 many New England settlers came to the upper part of South Carolina and laid the foundation for tens of thousands of spindles which in due course of time were to hum in the Piedmont area. Among these pioneers were George and Leonard Hill, W. B. Shelden, William Bates, a close relative of Hammetts, the owners and operators of the Chiquola Cotton Mill at Honea Path, John Phillip and Lindsay Weaver, and James Edward Henry.

(continued on page twenty-three)

Government Cotton Spinning Laboratory At Clemson College

Laboratory Aids Farmer And Spinner

Since 1921 the United States Department of Agriculture, in cooperation with Clemson College, has maintained a cotton spinning laboratory in the Textile School at Clemson. Here samples of cotton ranging from a few ounces to 50 pounds or more are manufactured into yarns, cords, and fabrics, and the products subjected to many tests, to provide accurate information on the manufacturing quality of the cottons and the serviceability of the products made from them. This information, in turn, plays an important part in the broad Federal State Cotton Research Program being conducted by several Bureaus of the U. S. Department of Agriculture, in cooperation with the various cotton producing states.



Left: Mr. W. H. Gray. Right: Mr. J. M. Cook, Head of Government Laboratory

Several rather distinct applications are made of the results obtained from the spinning laboratry at Clemson. These include: the evaluation and calibration of the grade and staple standards; the evaluation of the results from experiments in the breeding, production, harvesting, ginning, and handling of cotton; the correlation of the properties of the cotton fibers to those of the yarns, cords, and fabrics manufactured from them; and the development of more precise methods of getting the potential value out of cotton during manufacturing. Some of these factors are described in greater detail below.

The staff of the cotton spinning laboratory at Clemson College, headed by J. M. Cook, consist of 11 persons of whom 9 are technical and 2, clerical workers. A similar laboratory established in 1936 is now in operation at College Station, Texas, in cooperation with the A. & M College of Texas. Both the South Carolina and Texas laboratories, known, respectively, as the Eastern and Western Regional spinning laboratories, are under the direction of M. E. Campbell, whose headquarters are in Washington. The spinning work, together with the ginning investigations conducted at Stoneville, Miss., and the physical, chemical, X-ray, and color investigations in Washington, constitute what is known officially as the Cotton Utility and Standards Research Section of the Division of Cotton Marketing. Dr. R. W. Webb is in charge of all of the work of this section.

The textile machinery used in the tests at Clemson for the most part is of regular commercial design, cut down in length in some instances and containing some modifications to adapt the equipment to the special requirements of the test work. For a number of years, use has been made of some of the spinning equipment in the old Textile Building at Clemson. With the completion of the new building the project has moved into new quarters, and at the present time an effort is being made to obtain a complete series of new machinery for use in this experimenal work.

The manufacturing tests are conducted under rigidly-specified humidity conditions, maintained by automatically-controlled humidifiers. In the laboratory where tests are made of yarn, cord, and fabric, both temperature and relative humidity are controlled to "standard" conditions —70 degrees F. and 65 percent R. H.

The equipment and apparatus in the yarn and fabric testing laboratory are unusually complete, and include the most modern devices available for textile testing. Among the machines to be found there are the following: tensile strength testers for yarn in single strand and skein form, and for cord and fabric; automatic yarn reel; motor-driven rotary racks for conditioning specimens; inclined-plane tester for yarn and cord, for tensile and repeated-stress tests; fabric bursting-strength tester; yarn numbering quadrants; twist counters; sliver evenness tester; roving tester; electric oven for determining moisture regain; stroboscope for studying the action of travelers, fliers, and other fast moving parts; several types of tachometers; complete equipment for making cotton fiber quality measurements; microscopes, chemical balances, and many other important pieces of equipment. Some of the equipment was designed and constructed by members of the technical staff. Two of the most important and interesting pieces of apparatus were imported from England. These are an automatic single-strand tester, and a device known as a Shirley analyzer. This latter machine was developed at the Shirley Institute near Manchester, and is used for making precise measurements of the foreign matter content of small samples of cotton.

(continued on page twenty-two)

Textile Warehouse Co.
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COMPLIMENTS OF
S. M. BEATTIE

Differences In Quality Of Rain-Grown And Irrigated Cotton Shown By Tests

Preliminary results of spinning and fiber tests on irrigated and rain-grown cotton from the 1939 crop were released on November 12, 1940 by the Agricultural Marketing Service.

Manufacturers have claimed that irrigated cotton has more waste than rain-grown cotton, produces yarn of lower strength, produces yarns and fabrics that are unsatisfactory in appearance, is harder to spin, and is difficult to dye. These claims and their reflection in price differences between rain-grown and irrigated cotton were responsible for the study by the Agricultural Marketing Service.

Samples for the tests were gathered during the 1939-40 season from the Memphis territory, which includes Mississippi, Arkansas, and Louisiana; from California; and from the Arizona-New Mexico-Southwest Texas territory. The samples, believed to be representative of the crop in each area, were packaged and shipped to the U. S. Spinning Laboratory at Clemson, S. C. There they were spun into yarns and tire cords and woven into cloth under controlled laboratory conditions.

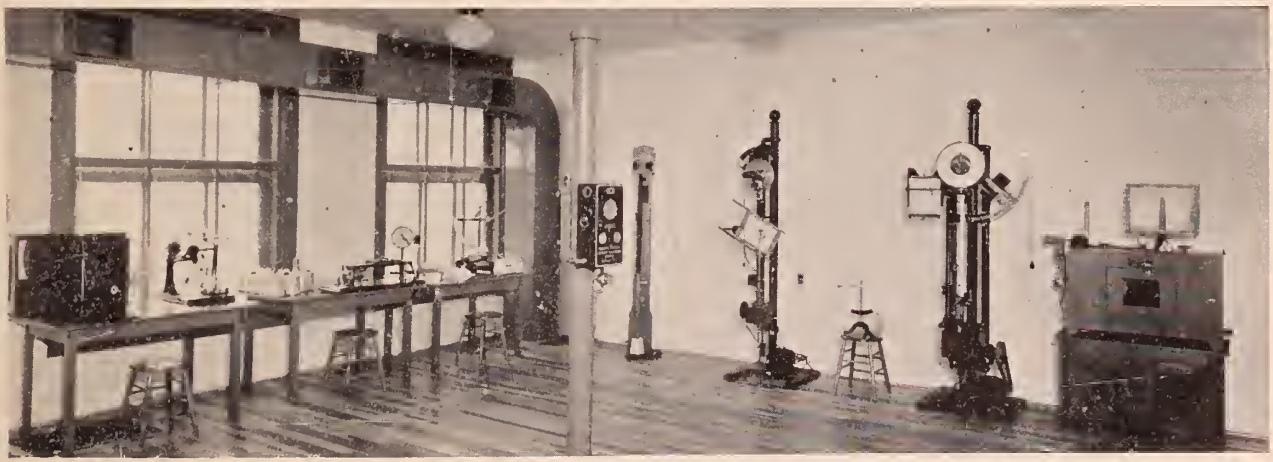
Grade for grade these tests showed that cottons having staple lengths of 1 1/16 and 1 3/32 inches produced in the Memphis territory yielded less manufacturing waste than those from sections where the cotton was grown under irrigation. But the longer staple 1 1/8 inch cotton produced in the Memphis territory was somewhat inferior to California cotton from the standpoint of waste.

The tests showed that yarns spun from cotton having staple lengths of 1 1/16 and 1 3/32 inches produced under rainfall conditions in the Memphis territory were neither consistently higher nor lower in strength than those produced under irrigation in California. But yarns made from 1 1/8 inch cotton from the Memphis territory averaged about 4 percent stronger than those made from California cottons. In all three staple lengths, cotton produced in the Memphis territory yielded yarns 2 to 11 percent stronger than those made from irrigated cotton from the Arizona-New Mexico-Texas region.

Rain-Grown Cotton Yarns Show Satisfactory Appearance

In appearance, yarns spun from rain-grown cotton were more satisfactory than those spun from irrigated cotton. Yarn appearance is measured by comparison with standards prepared by the Agricultural Marketing Service which show variations in neps, foreign matter, and evenness of yarns. Differences in yarn appearance are reflected in cloth manufactured from the

(continued on page twenty-four)



Testing machines and equipment used by the spinning laboratory

H. H. WILLIS,
Dean of
The Clemson Textile School

Something About Our Faculty

By J. W. HOWARD, '41

Reading left to right, first row: A. E. McKenna, Joseph Lindsay, Jr., Dean H. H. Willis, R. K. Eaton, E. F. Cartee; Second row. W. E. Tarrant, M. L. Huckabee, W. C. Blair, G. H. Dunlap, J. V. Walters; Third row: W. L. Hicks, Gaston Gage, T. A. Campbell. Not shown above: W. B. Williams, I. S. Pitts.

A. E. McKENNA
Head of Weaving and Designing Dept.

Mr. McKenna was graduated from the Melliand School of Design in 1922. He then gained three years of experience in the industry, working in the card and weave rooms. He left the mill to come to Clemson to teach in 1925. He served in this capacity until 1929, when he was granted a one year leave of absence to complete work on his B. S. degree, receiving this degree in 1930 from Clemson College. The work on this degree consisted of general engineering and academic work. Mr. McKenna received his Master's degree from the University of Tennessee in 1933. Since then he has written numerous articles relating to the weaving of fancy fabrics, most of them appearing in the Melliand Textile Monthly. He and Mr. A. E. Shinn are co-authors of the article "Weaving Fancy Meshes On The Slotted Doup." He is a member of several national fraternities, among them being Phi Psi, honor textile fraternity. Mr. McKenna, beginning his sixteenth year at Clemson, has done much to improve the Weaving and Designing Department, and we feel certain that he will look to the betterment of this department in the future.

G. H. DUNLAP

Acting Asst. Prof. of Carding and Spinning

Mr. Dunlap was graduated from Clemson College in 1928. He immediately assumed a position with the faculty upon graduation, a position he still holds today. Before entering Clemson, Mr. Dunlap worked in the card and weave rooms of Aragon Cotton Mills in Rock Hill, S. C. He has done rather extensive work in textile research, working with the U. S. Department of Agriculture in this capacity. He has written, in conjunction with Mr. Willis, several articles, among them being "Comparative Spinning Tests of Cotton Grown in Texas in 1932," "Cotton Spinning", and "Textile Mathematics." Mr. Dunlap attended the University of North Carolina Summer School in 1935. His graduate work consists of courses at The Massachusetts Institute of Technology in 1936, and work at Pennsylvania State College in 1939 and 1940. Mr. Dunlap is a member of Phi Psi, honor textile fraternity. He is at present teaching spinning and textile mathematics. Textile students look upon Mr. Dunlap as a friend and a councelor as well as an instructor, due to his ready willingness to help whenever problems confront them.

T. A. CAMPBELL

Assistant Professor of Weaving and Designing

Mr. Campbell was graduated from The Clemson Agricultural College in 1928. Upon leaving Clemson, Mr. Campbell accepted a position at Chester High School, where he taught bookkeeping and mathematics. He left Chester to join the Aragon-Baldwin Cotton Mills, where he served as assistant to the Secretary and Treasurer. He stayed with this company during the years of 1930-1931, after which he left to work with Ralph E. Loper and Co., where he remained seven years.

Mr. Campbell has done graduate work at Pennsylvania State College and Clemson College. He is the author of "Elementary Textile Costing", the textbook used by the students studying costing. He is a member of Phi Psi, honor textile fraternity, and is also a member of Iota Lamba Sigma, another nationally known fraternity. Mr. Campbell is married and has two children. His hobbies include raising and cultivating flowers and collecting stamps.

W. G. BLAIR

Assistant Professor of Carding

Mr. Blair was graduated from the New Bedford Textile School in 1908, majoring in cotton manufacturing. He accepted a position with the Whitin Machine Works demonstrating the Whitin comber in the Eastern and Middle Atlantic states. He was then placed in charge of comber experimental work on waste with the Whitin company at the Ashburn Waste Experimental Plant, Ashburn, Mass. Mr. Blair later served one year with the Johns Mansville Co., trying to improve the manufacturing and standardization of asbestos products. He accepted a position as overseer of carding with the then nationally known Dexter Yarn Co., Pawtucket, R. I.

Mr. Blair came to Clemson to teach carding and spinning, in which capacity he most ably served from 1914 to 1920. In 1920, he went to work with the U. S. Department of Agriculture, where he was placed in charge of cotton spinning research. In 1924, he joined the Armstrong Cork Co., as textile advisor, the work dealing with the introduction and improvement of cork covered top rolls for the carding and spinning rooms. In 1927 Mr. Blair then experimented with the actual raising of cotton on a small place just outside the city of Greenville, S. C. He returned to Clemson in 1936 as assistant professor of carding and spinning, in which capacity he is serving us most capably and efficiently at the present time

* * * *

The Clemson textile department has maintained the unique record over the past 13 years of having placed all of its graduates who wanted to secure jobs in textiles or allied industry.

MR. JOHN T. WIGINGTON

John T. Wigington finished the textile course at Clemson Textile School in 1923. He is in charge of the Government Spinning Laboratory, Cotton Division, U. S. Department of Agriculture, College Station, Texas.

The Editors' Page

SPECIAL TO FRESHMAN TEXTILE STUDENTS

Phi Psi

Fraternity

WOULD YOU LIKE TO BECOME A MEMBER?

Probably you have noticed some textile students lately who were carrying a shuttle suspended from their necks, had peculiar marks painted on their cheeks and carried boxes full of mints, chewing gum, and cigarettes. Perhaps you wondered what it was all about. In case you did not find out, these men were being initiated into Phi Psi; the highest honor that can be accorded a textile student at Clemson. What is Phi Psi? Phi Psi is the national honor textile fraternity. Its requisites for membership are high scholastic standing, high moral character, and extra curricular activities. Those standards are met by a select few, and it is the purpose of this editorial to get you to think about being a member of this select few. Now is the time to think ahead to your Junior or Senior year—you can be chosen for membership either year, and decide that when you reach this stage of your college career, you will be eligible for membership in this great fraternity of textile men. Your decision to make that extra effort so necessary for this achievement must be backed by hard work during the ensuing years. You will be amply rewarded for your efforts, however, when you have finally reached your goal. Come on, Freshmen, start working now towards an excellent end, Phi Psi membership.

—G. W. C.

AGAIN, WE SAY, "THANK YOU!"

The Bobbin And Beaker was organized in November 1939 by the members of Iota Chapter of Phi Psi, national honor textile fraternity at Clemson. The first issue of the magazine was published in March 1940. A copy of the magazine was given to each Textile student, and a copy was mailed free-of-charge to every mill in South Carolina, North Carolina, and Georgia. Two-hundred copies were carried to Philadelphia and distributed to the delegates to the 37th annual Phi Psi convention by the two delegates from Iota chapter.

This year the Bobbin and Beaker was turned over to the students of the textile school.

Dean Willis has given the staff of the Bobbin and Beaker a well-lighted, heated, and well ventilated room which is just across the hall from the Phi Psi club room.

Again, we wish to say that we appreciate the cooperation of Dean H. H. Willis of the Clemson Textile School, and of the Clemson College Business Manager and his staff who have rendered practical advice and aid. We appreciate the article by Professor G. H. Dunlap. We are grateful to Mr. J. M. Cook, head of the cotton testing laboratory of the U. S. Dept. of Agriculture at Clemson for the valuable information he contributed to the magazine. We thank the students for the articles they have written and also those students who have been ever-willing to render any assistance possible.

Above all, we thank those who have made the publication of the magazine possible by advertising through The Bobbin And Beaker, and we sincerely hope that our services will prove as valuable to you as yours have to us.

—W. R. O.

J. J. Lyons, general manager of Orr Cotton Mill, Anderson, S. C., completed the textile course at Clemson in 1925.

R. J. Cheatham, Clemson textile graduate of 1916, is in charge of the Manufacturing Division of the new Regional Laboratory, U. S. Department of Agriculture, New Orleans, Louisiana.

Short Features

Clemson Boasts Modern Courses

The new home of the Clemson Textile School. This new building, built in 1938, cost approximately $475,000, and has 127,000 square feet of space.

"Clemson's School of Textiles Trains Young Men For Work in Mill Industry Over Nation"

Completely surrounded by the South's greatest industry—Textiles—Clemson College has developed one of the most complete and efficient textile departments to be found in any American college.

Bachelor of Science degrees are offered in three major courses of study, Textile Chemistry and Dyeing, Textile Engineering, and Weaving and Designing, and at present a total of 340 students are enrolled in the Clemson school, 95 of these are candidates for degrees at the end of the current school year.

Established in 1896, the Clemson School of Textiles became the first in this country to become affiliated with a college and for this reason is generally accepted to be the oldest School of Textiles in America. There are older textile schools that are not connected with a college or university. The Clemson textile students also gives Clemson the distinction of having the largest full time day student enrollment.

Directed by Dean H. H. Willis, a Clemson graduate of 1917, who returned to his Alma Mater to head his department in 1930, the Clemson School of Textiles offers the textile student a curriculum designed to give preparation for any branch of the textile industry. Additional work and elective courses enable students to adequately prepare themselves for positions as designers, salesmen, research laboratory technicians, technical journalists, and cost and management experts.

REORGANIZATION OF COURSES EFFECTED

In the past two years the Clemson College Textile faculty has undertaken the reorganization of textile courses at Clemson and the preparation of textile teaching material especially adapted to the ever-changing conditions of the industry. The work has been carried on in cooperation with the Textile Foundation and covers all subjects in yarn manufacturing from the cotton grading through the finished spinning. The Clemson faculty now plans to continue the work by teaching weaving subjects.

Where Some Of Our Textile Graduates Are Located

J. J. Norton, Jr., completed the textile course at Clemson in 1925. He is now superintendent of Goodyear-Clearwater Mills, Cedartown, Ga.

Roland L. Lee, Jr., finished the textile engineering course at Clemson Textile School in 1925 and is now Head of the Textile Engineering Department, Texas Technological College, Lubbock, Texas.

J. F. Blackmon, Clemson textile graduate of 1916, is general manager of Pelzer Mills, Pelzer, S. C.

J. A. Fewell completed the textile course at Clemson in 1925 and is now with the Burlington Mill, Radford, Virginia.

J. E. Garvin finished the textile course at Clemson in 1920. He is manager of the Blue Ridge Rayon Mills, Alta Vista, Virginia.

Chas. D. Green, Clemson textile graduate of 1928, is general manager of Mills Mill, Greenville, S. C. and Fairforest Finishing Company, Spartanburg, S. C.

M. L. Hall completed the weaving and designing course at Clemson Textile School in 1932. He is superintendent of weaving at Ranlo Manufacturing Company, Gastonia, N. C.

J. D. Jones, Clemson textile graduate of 1915, is general superintendent of Union Buffalo Mills, Buffalo, S. C. He has a son, J. D. Jones, enrolled in the senior class at Clemson Textile School this year.

J. P. Kinard, manager of Cotton Grey Goods Department, William Whitman Company, Inc., 40 Worth St., New York City, finished the textile course at Clemson in 1922.

J. R. Swetenburg, superintendent and purchasing agent for Gluck Mills, Anderson, S. C., finished the textile course at Clemson in 1922.

WILLIAM G. ASHMORE

By GORDON E. WILLIAMS, '42

The faculty and students of the Textile School at Clemson are always glad to hear of the achievements of former students. It was with great pleasure that many of them recently read of the signal honor accorded "Bill" Ashmore of Greenville when he was asked to write an article on the textile industry in South America for the Encyclopedia Brittanica.

"Bill", as he was known, was a charter member of the Blue Key at Clemson, a member of Phi Psi, a captain on the regimental staff, a charter member of the C. D. A., and editor of the "Tiger". Besides these Bill belonged to many other campus organizations, and when the Gamma Alpha Mu was organized, he was made an honorary member.

Upon graduation, he joined the staff of the "Textile World" of which he is, incidentally, now the Southern editor. In 1939 Mr. Ashmore made an extensive tour of South America, studying the conditions and trying to get a cross-section of the opinion of the people of that country. Spending around five months down there, he interviewed native business men, foreign ministers, and American business men, staying much of the time on coffee plantations and in native homes.

Of interest to the textile students is Mr. Ashmore's opinion on the opportunities for the young man in South America. "With capital, initiative, and a sound knowledge of conditions, the chances are that an American with modern management and machinery could do very well in South America. However, this same man with capital and other requisites could probably do all right at home."

Concerning everyone now is the political interests of South America. Mr. Ashmore was kind enough to give the writer his opinion on this situation. "Most of the native citizens of those countries do not want to be dominated by Germany or Nazism, but they will have very little choice if Germany wins this war. In several of the countries there already is a large body of German-born population and pro-Nazi sympathizers. The United States will have to reorganize its economic and political thinking if we are to keep Europe out of the Western hemisphere. Dollars and guns are worth more than all the treaties we can make with Latin America."

Phi Psi Activities

By G. W. KIRBY, '41

Recently inducted into the Clemson Chapter of Phi Psi (Iota Chapter) were twelve outstanding textile students and one faculty member. This is the largest number of new men ever to be inducted into the Clemson Chapter of this honorary textile fraternity at one time. This increase in initiates was voted on by the oldest members at a recent meeting, because they felt that the expanding Textile School warranted the expansion of the Phi Psi membership quota.

Phi Psi Initiates

The twelve students, seven seniors and five juniors, represent outstanding students, both in textiles and extra curricular activities. The faculty member, Prof. E. F. "Bud" Cartee, is well known by Clemson Textile students for his courses in fabric analysis and loom-fixing which he presides over so capably. The senior initiates are John W. "Duck" Howard, Greenville, S. C.; Hervey H. "B. B." Robinson, Union, S. C.; T. "Dick" Osteen, Greenville, S. C.; John Willys Sullivan, Lodge, S. C.; Robert P. Timmerman, Laurens, S. C.; and George S. "Gus" Wham, Mountville, S. C. All of the seniors rank as First Lieutenants in the Clemson College Cadet Corps, except Robinson, who is a Captain. The juniors are James H. "Jimmie" Barton, Anderson, S. C.; James J. "Cass" Casserly, Flushing, N. Y.; Charles R. "Charlie" Howard, North Augusta, S. C.; Harry L. Sturgis, Rock Hill, S. C.; and Gordon E. Williams, Greenville, S. C. Barton is a battalion sergeant major; Howard is a regimental color sergeant, and all of the other juniors rank as sergeants in the cadet corps.

These initiates, "worms," as they are called during Phi Psi initiation, are required to carry shuttles for a period of two weeks, furnish mints, candy, and cigarettes to the old members known as "generals", and to do any other thing the nimble minds of the generals can concoct.

To these initiates "The Bobbin and Beaker" extends its heartiest congratulations for their wonderful achievement, and wishes for them continued success at Clemson and in their chosen field of endeavor after leaving Clemson.

PHI PSI CLUB ROOM

The Phi Psi Club room has had its face lifted this year. All of the old furniture has been worked over or discarded and new seat covers have been placed on the cushioned chairs. A new radio with a record changer has been installed, and most of the currently popular songs as well as some old favorites are represented in the record rack. The floor has been thoroughly cleaned, and attempts are being made to secure rugs for it. The number of pictures on the wall has increased, and now the club room has that old "homey touch." Incidentally, the latest magazines, both popular and technical, are always on hand to help pass that idle time. What idle time? A number of the members now find that the club room is an ideal place to study, and are taking full advantage of this feature.

Phi Psi is well represented on the staff of The Bobbin and Beaker this year. Genial, efficient Bill O'Shields is editor of the magazine. Wade Carder is capably serving in the capacity of business manager, while Gus Wham tells the world about The Bobbin and Beaker from his post as publicity agent. G. Walker Kirby and "Duck" Howard are collaborating as managing editors; while Dick Osteen and E. W. "Chick" Dunham are really working hard on the advertising staff. Sam Jenkins is slated to handle the circulation end of the magazine. A. C. Nalley is associate editor. These men are just carrying on the good work of other Phi Psi men who published the first issue of The Bobbin and Beaker.

N. Y. A. and The Textile School

By M. D. MOORE, '43

The National Youth Administration plays a great part in the textile school at Clemson. At present, there are forty students, majoring in textile courses, who help defray their expenses while in school and who obtain a better understanding of the textile industry by the aid of the National Youth Administration. The type of work varies; very few students do the same kind of work.

More students are employed in the department of carding and spinning than any other department. In this department, eleven boys each day obtain a better understanding of textile machinery and the textile industry by practical experience. G. W. Kirby, a textile engineering senior, is student supervisor of most of the NYA students in the spinning department. Professor G. H. Dunlap is the faculty supervisor. The general work of the students is to operate carding and spinning machinery; however, there are many other duties to be performed. Machines are often tested for production; machines must be cleaned and oiled in preparation for classes; papers have to be graded, and numerous other duties are required of students.

The department of chemistry and dyeing affords work for six students. However, these students spend practically all their spare time at work and are kept very busy in performing their various assignments. Professor Joseph Lindsay, Jr., head of the Chemistry and Dyeing department, is faculty supervisor of these students. NYA students in this department prepare reagent solutions, wind yarns, prepare all types of textile fibers for use in the laboratories, as well as assistant in dyeing and bleaching semi-practical lots of material for the other departments of the Textile School.

In the department of Weaving and Designing are ten boys who profit immensely by NYA work. Most of these students work under the supervision of Professor A. E. McKenna, head of the weaving and designing department. L. E. Gatlin, Jr., a textile engineering sophomore, is assigned to the post of student loom-fixer. Before entering college, Gatlin was employed for two years as loom-fixer for one of the mills in his home own. Other types of work done by students in the weaving and designing department include operating of winders and looms, and the cleaning of bobbins. Students must also keep the machinery clean and well oiled. They must always be on the lookout for faults in the machinery and report all defects to their supervisor. NYA students must always keep enough products of their machinery on hand for use in classes in the textile course.

In many ways NYA students are being benefited by the program. They are being paid a salary for the work they do, but an even greater compensation than the salary is the knowledge and self-confidence they receive through practical experience in the operation of mill machinery and the solving of problems which confront men every day in the textile industry.

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Determining End Breakage In Spinning

By WILLIAM R. O'SHIELDS, '41

Very often a mill executive likes to know in exact figures just how his spinning is running. As a general rule a spinner will say that his spinning is running either "good" or "bad" not knowing in exact figures just what he himself means by "good" today and "bad" yesterday. Today, keen competition has made it absolutely necessary to make every day in the spinning room a day of "progress" instead of a day of "chance."

Many methods have been used in determining end-breakage in spinning, but probably the most accurate way is to have a disinterested party do the testing. By this method the tester has no connection wth those who would like to see the test show up better than usual, nor does he have any connection with those who would like to see the test show up worse than usual.

Above all, the tester should know how to approach the spinner, for the approach to the spinner can "make or break" the test. The tester should explain to the spinner exactly what he intends to do and that he is not a "minute man" and is not checking up on her work, but upon the efficiency of the machine and the existing spinning conditions. With just a simple explanation he is able to get the cooperation of the spinner and therefore makes the test easier and much more valuable. One who does not use tact in his approach to the spinner should not be used to make an end-breakage test.

An end-breakage test can be made easier by using forms which contain all data the tester should obtain before starting the test and should also contain all headings and classifications which the tester is to use while making the test. A complete list of the most common causes of end breakage makes the test much easier and the time necessary to take the test much shorter.

It is suggested that the courses be classified under Material, Machine Operation, Cleaning, Doffing, and Unclassified. A high percentage of Unclassified end breakage gives no indication as to the ability of the tester. The tester who has a relatively higher percentage of unclassified might be perfectly honest in classifying the causes and those of which he was in doubt he placed under unclassified and proves to be a better tester than the one with a low percentage of unclassified.

It is also suggested that tests be made at two periods of the day, one on the morning shift and one on the evening shift each period being approximately three hours long, for the tester will usually give a more accurate report up to three hours, but after three hours the tester becomes tired and his efficiency decreases.

In making an analysis of the results of the test, the possibilities are great for an executive with an analytical mind to determine exactly where his greatest troubles really occur. If the results of these tests were discussed with the overseer of carding and the overseer of spinning the carder could be on the lookout for the causes for the end-breakage resulting from the material being produced in his department, such as, the number of hard-ends made in the card room, bunches in roving resulting from improper and inadequate cleaning of the frames, improper settings, and careless "cleaning-down" overhead. The spinning room overseer could be on the lookout for causes of end-breakages under "Machine Operations", "Cleaning" and "Doffing". See that the rings are given proper care, the travellers changed at the proper time, and that the steel roll and top rolls are not injured by the spinners hook, knife, or fingernails.

If the mill executive knows definitely from where his trouble comes, he can combat the trouble much more effectively, and the test also enables him to see at a glance which way to strike to eliminate the troubles.

The first artificial silk ever to be produced commercially was made from nitrocellulose, a substance formed by treating cellulose with nitric acid. In plastics and explosives, it is still important. The abandonment of this method has been due to its higher cost and to the improved qualities of viscose and acetate rayons which have given them preference for textile purposes.

History Of Rayon

By M. D. MOORE, '43

Rayon, a textile fiber made from modified cellulose, is fast becoming more and more in demand by American and foreign consumers. Because of its many types and advantages, rayon is rapidly displacing many textile fibers which, until now, have played very important parts in the textile industry.

The leading rayon process is that of using the solution known as viscose, discovered in 1892 by two English chemists, Cross and Bevans, who treated wood pulp with caustic soda and bisulphide of carbon to form a plastic cellulose compound readily soluble in water.

Prior to 1900, extensive laboratory experiments for the production of viscose artificial silk were made in Massachusetts; the first commercial production was started in Lansdowne, Pa., in 1903, and several hundred pounds per week were produced at the plant during the following five or six years. This plant failed financially because the product was too irregular in quality and too costly to produce on a small-scale. The first large-scale production of viscose rayon in America began in a plant erected by an English company, at Marcus Hook, Pa., in 1911, under the direction of the American chemist, Dr. Charles A. Ernst, who had first become engaged in viscose rayon research in the earlier small-scale production in Lansdowne, Pa. The new company controlled the basic viscose rayon patents and during the next ten years earned enormous profits as it was the only successful large-cale producer of rayon in the United States. After the expiration of the early viscose patents numerous other companies began operation here. Today there are dozens of large-scale producers of viscose rayon scattered over the United States. Approximately 75 percent of the rayon yarns now made in the United States are viscose.

Second in importance are yarns made from cellulose acetate, which type of cellulose was discovered in 1869 by German chemists Naudin and Schutzenberger, but its use was confined to plastic for many years. Cellulose acetate is made by treating purified cotton linters with acetic acid and acetic anhydride. In 1894 Cross and Bevan, the English chemists and inventors of the viscose solution, also patented a method of producing electric light filaments from cellulose acetate, and a German chemist, Emil Bronnert, made the first cellulose acetate textile yarn experimentally in 1899. Commercial production of cellulose acetate yarn was started in the United States in 1915, but no large-scale production began here until 1925, when a cellulose acetate plant at Cumberland, Md., built during the World War to supply aeroplane dope, was equipped to produce textile filaments from this material. The production here was under the direction of the brothers, Henry and Camille Dreyfus, Swiss chemists, who now operate similar plants in England, France, and Italy. Cellulose acetate yarns now account for almost twenty-five percent of the rayon produced in the United States. The cellulose acetate rayon process is more costly than the viscose method, but the yarn, because of its waterproof qualities, sells at a higher price for some purposes.

The third rayon process is the cuprammonium method in which cotton linters are treated with copper salts and ammonia to produce a solution from which the filaments are formed. This solution of cellulose was invented in 1857 by the German chemist, Schweitzer. The solution was first used for making filaments for electric lamps by Weston in 1882 and a French chemist, Despaissis, was granted the first patent for making a cuprammonium artificial silk in 1890. It earliest commercial development was in Germany in 1897 under the patent of Herman Pauly. During the next decade various attempts were made to establish rayon plants using this method in the United States, but none were successful here until 1924, when an American branch of the leading German manufacturers using it erected a plant in Tennessee. One other similar plant has been erected here since then, but the product is more costly to make than viscose rayon and domestic production by this method is now estimated at less than three percent of the total made here.

Carders And Spinners Meet

By G. W. KIRBY, '41

The fall meeting of the South Carolina Carders and Spinners Division of the Southern Textile Association was held on Oct. 12, 1940 at Clemson College, Clemson, S. C. Dr. Watson opened the meeting with a prayer, after which H. H. Willis, Dean of Clemson's Textile School, introduced Dr. R. Franklin Poole, Clemson College's new president. Dr. Poole welcomed the carders and spinners and stated that the facilities of the Textile school are at their disposal at all times. He spoke of the two objectives of the Clemson Textile School, which are (1) to train students for the textile industry, and (2) to aid the textile industry by doing research work.

Standing: Mr. Manning Bolt, Superintendent, Matthews Mill, Greenwood, S. C.

The highlight of the program was an interesting speech on national defense by Major G. Heyward Mahon, Greenville, S. C., who is chairman of the defense program for South Carolina and a former member of the Military Affairs Committee of the House of Representatives. Maj. Mahon was introduced by the chairman of the meeting, Mr. W. T. Morton of Monarch Mills, Union, S. C.

In his speech Major Mahon said that national defense had been his hobby for many years, and that during his tenure of office as representative from S. C., he had urged, and had been laughed at for so doing, an adequate national defense. He lauded the present administration for having done more to adequately prepare this country for defense than any other administration.

Major Mahon emphasized the fact that our National Defense Committee was wisely chosen, because it has been functioning smoothly and efficiently since its inception. "Every man, woman and child can best aid the defense program by doing the job you are doing now as well as you can," said Major Mahon. "The National Defense Committee, in addition to the production of defense goods, is endeavoring to keep the normal way of living and the normal production on ordinary goods going."

Major Mahon concluded his speech with a rousing denunciation of "slackers" and "profiteers" who try to harm the country instead of helping it. "What this country needs," according to Major Mahon, "is a revival of old-fashioned patriotism."

Major G. Heyward Mahon

The speaker volunteered to answer any question on defense the audience wanted to know about, and several questions were asked.

One question was asked about the effect of the draft upon textile employees. Major Mahon answered this by saying that all essential men engaged in the production of government defense products would be exempted from the draft. The importance of textiles to defense was emphasized in his statement that the "Defense Committee is making a survey of textile plants to determine what they were making and what they could make."

Mr. David Clark, Editor of the Southern Textile Bulletin, lauded this particular activity of the Defense Committee because, as he said, "Many mills could switch to manufacturing defense goods easily enough if they only knew what to make or how to make it."

In answer to a query about sabotage and saboteurs, Major Mahon made it clear that such conditions existed, and that the government is quietly doing a lot of work toward curbing such subversive activities.

Mr. Clark rose to say that he thought the South had nothing to worry about in connection with sabotage and saboteurs in its mills since most of the laborers in Southern textile plants are all loyal American citizens.

At the conclusion of Major Mahon's speech and after all questions had been answered, Mr. W. W. Splawn of Pelzer, S. C., took charge of the meeting and led the discussion of the ten questions considered. The answers to these questions varied considerably, and the author has decided to submit them to the readers in the hopes that they will send in their opinions which we will publish in a later issue. These questions are:

No. 1. Do you have humidifiers in Card Room? If so, what relative humidity do you carry?

No. 2. Have you had any experience with the spring tension device on card calendar rolls? If so, with what results?

No. 3. Have you tried the spring on the front drawing rolls as a cushion for the weight and what results?

No. 4. What causes some of the roving to tangle at top and throw one or more layers of roving?

No. 5. What yardage do you get on 30's warp, with a 1 13/16" ring, 8 1/2" bobbin?

What yardage do you get on 40's filling with a 1 3/8" ring, 8" bobbin?

No. 6. How many use mechanical cleaners on spinning?

No. 7. How often do you change travelers on 30's and 40's filling? How many do not change travelers?

SUMMER EMPLOYMENT

By G. W. KIRBY, '41

Of inestimable value to any textile student is summer employment which gives the student the practical experience so necessary to supplement theoretical training received at school. The advantages of summertime employment to the textile student are many-fold. Chief among these is the better understanding of class room work, because the student has seen a practical application of the theory studied in class. Frequently students with practical experience are called upon to explain something in the class room or in one of his numerous labs. The professors notice such students as this more quickly than other boys, and this may enhance the student's grade which certainly is to the student's benefit.

A very important part of summer-time employment is the contacts made in the textile industry itself. Frequently, because of his summer work in some plant, a student is hired upon graduation by that plant or some other plant to whom he has been recommended. Only by contact or association with something do we get to feel a liking or disliking for that something, and what better way is there for a student to find out if he likes or is suited to textiles than by working in a textile plant during his vacation periods? Many boys earn part of their school funds by virtue of their summer employment. The advantages to the student are many, and the only disadvantage is the forfeiture of his summer vacation.

Benefits of summer work do not confine themselves solely to the student; prospective employer's of the students are immeasurably helped in several ways. In the first place they get students who can go into a plant and assume positions of responsibility more rapidly than a man of theoretical training only. Employers are often able to judge a student's ability while he is serving his summertime apprenticeship, and when this student graduates, the employer can offer him a job with confidence in that student's ability to make good. Students employed on part time jobs frequently run tests for the mill which sometimes result in savings for the management. The employers get better trained men, because students with practical experience understand their theoretical training better and get more from it which makes them more valuable to an employer.

Wool--Yesterday and Today

By J. W. HOWARD, '41

Wool manufacturing in the United States is nearly as old as the country itself. But the history of wool dates back much further than the discovery of America. Wool was used for clothing in China before silk made its entry, and in Egypt before cotton was used on a commercial scale. The sheep from which we get our wool were supposed to have been brought here by an expedition of Mexicans, intent on settling in Arizona and New Mexico.

Sheep raising is now done on a commercial scale in every one of the forty-eight states. Rhode Island has the lowest production of wool, with about 12,000 pounds per year, while Texas leads with about 63 million pounds early. The United States is second only to Australia in the production of wool yearly, with Argentine ranking third on this list. The quality of the wool produced in the United States is as fine as any produced today.

One rather interesting point to observe is the fact that the American people are using far more wool today than ever before, yet there are fewer mills today producing woolen goods. Naturally, this point brings a question to mind as to how this could be possible. The answer to this rather perplexing problem is that large plants are slowly absorbing the smaller ones and installing precision-built, higher-speed machinery.

Despite the fact that wool is not used any longer for certain types of clothing, government figures indicate the use of wool has steadily grown. About 281 million pounds of fleece wool was grown in 1910, and about 40 million pounds of pulled wool was produced. Also, about 94 million pounds of wool was imported for use in this country. This gave a total of 415 million pounds of wool available for manufacturing purposes in 1910, and this figure increased to 532 million pounds by 1936.

At the turn of the century, many of the small mills were run by small cliques, usually families. This worked fine as long as demand stayed ahead of supply. The World War, however, upset the whole system of things, and it became necessary to greatly increase the supply to meet the tremendous demand the war placed upon the woolen industry. At the end of the war, consumption decreased so rapidly that many of the small mills were forced to close. Productive machinery began taking care of the woolen needs for the first time. Only the large mills were able to keep their machinery running, and the demise of the small mill soon became apparent.

As business moved to the larger plants, in order to maintain their status in the industrial world, much new machinery was developed along with new methods of manufacture. Much more expense in the form of high labor costs, increased taxes, and unionization was introduced to the industry. Little change was made in the preparatory machinery, speed being the only factor changed. The greatest change has taken place in the carding and spinning departments of the mill. Space does not permit the writer to explain in detail what changes were made, but suffice to say, greater production and speed have been attained through these changes.

But what of the woolen industry today? Can it withstand the tremendous competition placed upon it by the numerous synthetic fibres that have been placed on the market in the past few years? Let us examine a little more closely the factors that are cutting off the very life blood of the woolen industry. Adjustments can be made by manufacturers to change from processing natural fibres to synthetic fibers. The real threat to the woolen industry is the transfer of the manufacture of certain types of fabrics to other groups. It is plainly evident that rayon has brought many problems to woolen manufacturers. At first, mill men scoffed at the deal that rayon could possibly take the place of natural fibres, but today they seem to be grasping at the last straw, figuratively speaking. Woolen manufacturers no longer mix rayon with wool for a novelty effect, as was first the case. It is now being done because rayon is threatening to become a substitute for wool. The question naturally arises, "Wha can the woolen manufacturer do?" He can sit tight and watch the cotton mills move in on him, or he can fight this invasion by renovating his plant, changing personnel, etc., until he is ready to answer the challenge flung out to him by the invader.

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GOVERNMENT COTTON SPINNING LABORATORY AT CLEMSON COLLEGE

(continued from page eight)

The U. S. Department of Agriculture, through its Bureau of Plant Industry, and through its fiber and spinning laboratories, is endeavoring to find ways and means by which the farmers can produce better cotton. While this has always been desirable, the need for better cotton has never been as urgent as it is now. First, if the United States can hope to regain and maintain for its cotton the relative position in the world's markets that it once held, it must produce better cotton than its competitors. And these competitors, aware of this fact, are themselves attempting to produce cotton of better quality. Second, American spinners are becoming more "quality conscious." With the increased use of research in the textile industry, cotton manufacturers are paying more attention to the quality of their products and, consequently, to the raw material used.

How does the quality of cotton grown under irrigation in the Southwest compare with that of rain-grown cotton in the main Cotton Belt? What were the reasons for the relatively poor spinning quality of the 1937 crop, reported by so many spinners? What is the new Sea Island like? How does the new Sakel x Pima cotton compare with Pima? What affect does speed of gin saws have on the quality of cotton? Is the quality of lint picked with new cotton picking machines as good as that of hand picked cotton? What happens to the spinning quality of cotton if the fibers in the bale are highly immature? What is the best temperature to use with the recently-developed cotton driers now being used at so many gins? Does storage affect the spinning quality of cotton? Are the fibers injured when the bale is compressed to "high density?" These are a few of the many practical questions which the spinning work at Clemson College is concerned with.

Cotton research laboratories in various parts of the world are concentrating on ways and means of predicting the manufacturing behavior and service performance of cotton free from a new quick and inexpensive laboratory test Until such a Utopia is reached, however, nothing can take the place of a manufacturing test, properly conducted under adequate conditions.

THE DEVELOPMENT OF THE TEXTILE INDUSTRY IN SOUTH CAROLINA

(continued from page six)

It is not definitely etablished who was responsible for the erection of the first cotton mill in South Carolina. There are divided opinions, some believe the Weavers, while others think the Hills shold be given the distinction. Anyway, the records show that the Industrial Manufacturing Company, founded and erected in Spartanburg County by the Weavers, soon went bankrupt, and next we find the Weavers located in Greenville County, where they erected a mill on the Tyger River.

Many historians are positive that the Hills erected a mill in Spartanburg County in the year 1816. The mill does not exist today but the property now belongs to the Enoree Manufacturing Company.

William Bates, after failing in his adventure in Spartanburg County, moved to Pelham, South Carolina and started the operation of a mill.

As to the development in Greenville County Col. S. C. Crittenden states that there were three mills in the county during the year 1835. One was Vardy McBee's, on Reedy River, six miles from the village of Greenville; another known as the Weaver Mill was situated 19 miles north of Greenville, and the other was the Batesville Cotton Mill, located on the Enoree River ten miles east of Greenville, and was owned by William Bates.

According to the records of time a cotton mill was erected at Autun, South Carolina, now known as LaFrance, in 1838. It was built by B. F. Sloan, Thomas Sloan, and Berry Benson. The plant was capitalized at $50,000 and was operated by water power. It is claimed that this is the oldest mill in the South in continuous operation.

In 1846 William Gregg built the first big mill in South Carolina. The plant was located at Graniteville and contained 8400 spindles and 300 looms. It was only after a long and bitter fight in the General Assembly that Gregg secured his charter for the organization of his mill. The application for the charter remained in the hands of the General Assembly for several years, and finally a favorable report, by the nine committeemen on manufacturing, was reported showing a majority of one.

The epoch marking periods in South Carolina of the cotton mill industry may be dated in the year 1847, when the Graniteville Company first put its goods on the market, and the early eighties when other pioneers began to see the possibilities of the greatest industry in our state.

By 1860 the cotton mill movement had expanded to such an extent that no one could deny that the manufacture of cotton cloth was supplementing the raising of cotton. The textile industry and agriculture by 1860 had joined together and created a dual system of wealth that placed the state third in the per-capital wealth of the United States.

There were eighteen mills in South Carolina at the beginning of the Civil War and only eleven survived, nine of the eleven were in Greenville and Spartanburg counties. Emerging from the catastrophe with only eleven mills, by 1880 the number had increased to fourteen. In the chaos of the period the development of more plants lay practically dormant until the movement of 1880. Then in the same spirit of wisdom and courage with which General Robert E. Lee turned to his broken South, an unusually able group of men came forward to build up and guide the present-day textile industry. The movement from its emergence about 1880 until the present is purely a picture of industrial romance. The deans in this school of romantic adventure were D. E. Converse, Lewis W. Parker, Captain Ellison A. Smyth, Col. J. P. Hammett, Dr. W. C. Hamrick, Captain J. H. Montgomery, Leroy Springs, and D. A. Tompkins, whose field of influence was by no means limited to North Carolina. In the succeeding decade came James L. Orr, William Ernest Lucas, John B. Cleveland, Robert McCaughrin, W. B. S. Whaley, T. E. Moore, John Geer, Captain W. A. Courtney, and a long procession of strong young men. The earliest pioneers were the explorers. They blazed the trail. But it remained for the men just named to follow the trail and improve it. It would be unfair to those who ventured into the industry before Captain Smyth, Converse, Hammett and the many others, to single out one as the leader in the development since 1880. But in 1921 the publication "Commerce and Finance" was so impressed with the remarkable growth of the industry, that they were led to ask who had been the leaders in this so very important development; and being unable to answer the question to their own satisfaction, they mailed questionnaires to at least one officer of every important cotton mill of the South, asking him to consult with his principal officers and designate six men, living or dead, who in their opinion were best entitled to be considered as leaders by virtue of what had been done—or was being done, not only for their own enterprises, but for the interests of the southern textile industry as a whole. As a result of the ballot, Captain Ellison A. Smyth led the list.

According to Captain Smyth's own testimony, the beckoning call of one already within the industry, William Gregg, led him into the field, just as the industry today is calling to enterprising young men who possess inspiration, determination, and the will to become pioneers.

The ranking position South Carolina holds in textile manufacturing today is a mark of distinction attained by men of foresight coupled with an undaunted spirit. Picture if you can, an industry in our native state with only 30,000 spindles in 1860 that has now grown by leaps and bounds until the number now totals between 5,500,000 and 6,000,000 spindles. Only North Carolina outranks South Carolina in the total spindles, yet South Carolina takes first place in all America in total active spindles and active spindle hours. There are approximately 200 mills in South Carolina today employing practically one-fifth of the white population, and manufacturing from cotton, jute, rayon, wool and silk practically every known necessity for the existence of human beings.

Today, South Carolina's textile industry is great because of the friendly relations that existed from the beginning between those who were working to build it. Tomorrow, South Carolina's great enterprise will be still greater only through a spirit of mutual confidence and by mutual understanding.

DIFFERENCES IN QUALITY OF RAIN-GROWN AND IRRIGATED COTTON SHOWN BY TESTS

(continued from page nine)

yarns spun from cotton produced under rain-grown conditions in the Memphis territory were in most cases easily distinguished from those made from yarns spun from irrigated cotton. Fabrics made from the non-irrigated cotton contained fewer naps and particles of foreign matter than those made from corresponding grades of irrigated cotton. Yarn and fabric appearance is particularly important in uses, such as dress fabrics, where a smooth uniform appearance and texture is desired.

Laboratory tests revealed no differences in manufacturing behavior between irrigated and non-irrigated cottons. All of the cotton used in the comparative spinning tests were processed on the various machines without any unusual difficulty.

Dyeing tests of yarns and fabrics will be undertaken later.

The spinning tests were made under the general supervision of M. E. Campbell, who has charge of the Department's cotton spinning work, and John M. Cook, in charge of the Department's laboratory at Clemson College.

Samples Representative of Various Sections

In commenting on the results of the tests, Mr. Campbell said that he believed they were representative of cottons produced in the various sections in 1939-40. He added, however, that considerable variations in the quality of cotton within large producing areas is usually found.

"Cotton tested from California was generally found to be somewhat superior to that grown in other sections of the irrigated region," Campbell said. "It is not unlikely, however, that some cotton produced in Arizona-New Mexico-Texas territory is equal or superior to that grown in California."

Cotton produced under irrigation in the United States constitutes on the average about 7 percent of the total crop. It runs unusually high in grade and is considerably longer in staple than the average of the United States crop.

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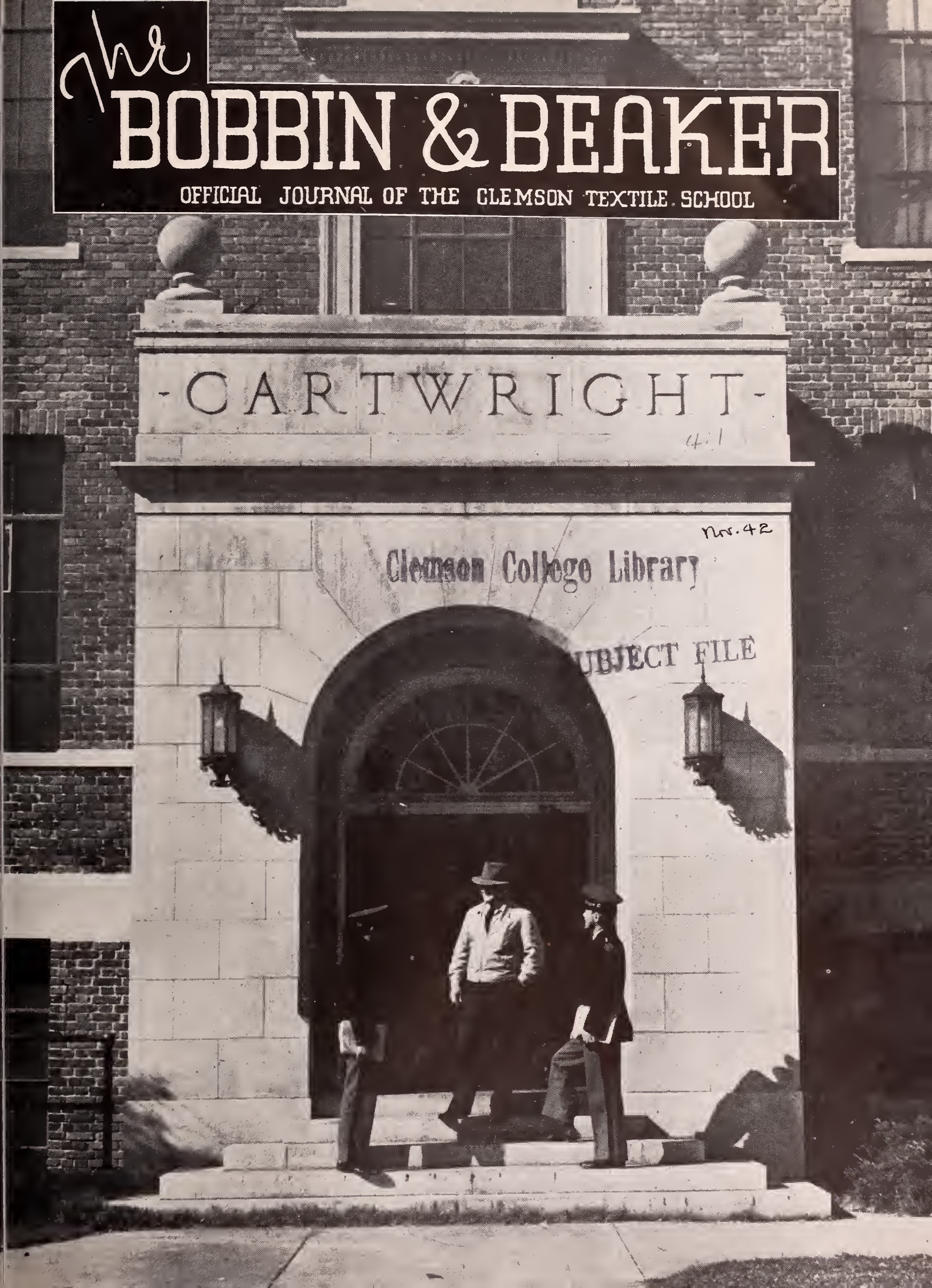

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The Bobbin and Beaker

The Official Journal of the Clemson College Textile School

VOLUME IV NOVEMBER 1942 NUMBER 1

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Dedication

IT IS with pride, respect and admiration that we dedicate this issue of THE BOBBIN AND BEAKER to those of Clemson who have made the supreme sacrifice and to those who are now serving in the armed forces of our nation.

"Your flaming torch aloft we bear,
With burning heart an oath we swear
To keep the faith, to fight it through,
To crush the foe, or sleep with you
In Flanders Field."

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CLOTH WITHOUT A LOOM

A few months ago a new textile material was perfected by Johnson and Johnson Company of New Brunswick, New Jersey. This new product is quite unique in that it is made without the use of a loom or even a spinning process. Although the new material has been in production for several months, it is not very well known to the manufacturing or merchandising fields because the Army and the Navy have assumed control of its production in order to fill their needs. Consequently, it is not likely that Masslinn, as it is called by its producer, will be available to the public until after the war, or until production is so adjusted that the Army and Navy requirements can be fulfilled while the consumer's needs can be supplied simultaneously.

The new fabric is truly something revolutionary in the textile industry. It will no doubt be capable of being produced much cheaped than fabrics manufactured by conventional methods, because there is no weaving or spinning process. The cloth is made directly from the product of the card. The soft web issuing from the card is treated with an adhesive chemical which strengthens the soft web and enables it to cling together when handled. From the card the soft web is run through a rolling machine resembling a paper pulp machine. It comes out as a stronger, finer sheet of cloth.

The manufacturers are not permitted to disclose just what purpose the material is being used for by the Army and Navy, but its logical to assume that it is very desirable for surgical and medical cloth after considering some of its characteristics. Of course, it may have other uses, too. Masslinn is very light in weight, weighing only about one ounce per yard (14-16 yds. per lb.) as compared to about six and one-half yards per pound for cotton fabric of comparable size. It is very economical, the basic cost being about four cents per yard. It is easily sterilized, very absorbent, and much stronger when wet than when dry. The cloth can be produced at a rate ten times faster than that for ordinary loom production.

Masslinn will, undoubtedly, take a prominent place in the textile industry after the war by reason of its extremely economical production and its versatile possibilities. The method of manufacture makes it an unusual fabric and from it may result many novelty fabrics for the textile market. The producers say, however, that it will not come to the front immediately because its present tensile strength renders it unfit for clothing materials, or for fabrics which must wear for long periods.

—The Bobbin and Beaker—

Lt. W. E. Tarrant, Jr., former Professor of Weaving and Designing at Clemson, was called to active duty in September. Lt. Tarrant is now an instructor in Ground Forces, United States Army Air Forces, and is stationed at Ellington Field, Houston, Texas.

The Value of Research to the Textile Industry

By John T. Wigington, Director of Research
The Cotton-Textile Institute, Inc.

CLEMSON OFFICE OF THE COTTON-TEXTILE INSTITUTE, INC. DIVISION OF RESEARCH
Mrs. Elsie B. Breazeale, Secretary, J. T. Wigington, Director of Research.

Never in the history of the cotton textile industry has been expressed such interest and enthusiasm in research as is shown today. The development of rayon, nylon, aralac, and other synthetic fibers, together with the fact that many important fibers such as silk, flax, jute, and sisal are no longer available, are two important factors which are stimulating the research work being conducted by the cotton breeders, ginners merchants, manufacturers and allied industries.

In an effort to meet the emergency needs of the nation, cotton manufacturers have found that many changes in their methods of selecting and processing cotton have been necessary to produce the quantity and quality of yarns and fabrics required for military purposes. The industry has consumed approximately 12 million bales of cotton during the past year, as compared with 6 1-2 to 7 million bales during a similar period of the First World War. This tremendous increase in production has been brought about with a third fewer active cotton spinning spindles than were in operation at that time. This accomplishment merits particular attention and demonstrates conclusively that research and technical skill have been largely responsible for this great feat.

The manufacturers of textile machinery, through their research and engineering departments, are aiding materially in the progress of cotton manufacturing. Equipment has been streamlined, speeded-up, refined and in many cases simplified. Briefly, these improvements include better opening, cleaning and blending machinery; better drafting, winding, spooling, warping, and weaving equipment.

The chemist and the chemical industries have pursued vigorously a program of research that has resulted in changes in the characteristics of tht raw cotton fiber, in new dyes, new bleaching agents, mil-

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Choose Synthetics

Guest Editorial . . . By C. W. Bendigo

Mr. Bendigo is at present connected with Judson Mills of Greenville, South Carolina, where he is in charge of the Technical and Engineering Department. He has been active in textiles all his life.

Mr. Bendigo began his career in textiles at the age of thirteen when he worked in a mill during his summer vacations from school. He attended Ursinus College in Pennsylvania and the University of North Carolina where he completed the course in Journalism. Mr. Bendigo has frequently written articles for "Textile World," "Rayon Textile Monthly," "Cotton," and "Textile Age." Last year he was invited to address the American Association of Textile Technologists on combination rayon yarns.

Mr. Bendigo was connected with Adams Millis Corporation in silk throwing until 1933 when he changed to rayon and assumed a position with Glen Raven "Silk" Mills. From 1935 to 1940 he held a position with Burlington Mills as superintendent of one of their High Point, North Carolina, plants. He joined Judson Millis in 1940 as assistant superintendent and has since been promoted to the position that he now holds.

To me the grass does not look greener in the other fellow's field. When asked for advice in regard to a vocation, I do not hesitate to recommend my own chosen field of synthetics—if the inquirer appears at all promising.

Note that I say synthetics, not rayon. It is true that rayon (acetate, viscose, cupramonium) lead the field of synthetics at present but to limit one's view to just rayons would be fallacious. Rayons as we know them now will probably be extinct within the next ten years. Just what will replace them probably no one can say except that they will be replaced by other synthetics starting with the strong rayons and the various chemical yarns of which Nylon at present is the most outstanding example.

The first thing that is necessary to think clearly in regard to synthetics is to divorce your mind completely of the thought that synthetics are a substitute for any other natural fibers. Probably one of the most unfortunate things that happened to rayon was for it to be called at the start "artificial silk." To think of synthetics as substitutes limits them to a degree that is as unfair as it is unwanted.

To take the point of view that synthetics are going to replace completely the natural fibers is also fallacious but what natural fiber contains the possibilities that can be seen in synthetics? That statement can be made still broader: do all of the natural fibers together contain the possibilities that are at present visible in the synthetics?

To illustrate, most people think of Nylon as one yarn, however this is only true because of the constrictions of war. Nylon rather should be thought of a general name for a whole new group of yarns such as the general term rayon includes no less than three commercially important types. Synthetic yarns can be manufactured to anyone's specifications and are commercially produced with a rubber-like elasticity of 150 to 300 percent. Synthetic yarn can be spun with a higher strength than is possible with any natural yarn. They are made with any size filament from that finer than the finest of natural fibers to any thickness desired. Filaments can be spun either with a continuous hole through the center of them or with little bubbles protrhding from the filaments each individually sealed. Synthetics can be manufactured with permanent crimp, with smooth or uneven surfaces. They normally are extruded strictly uniform as to size but can also be varied in whatever proportions desired. Synthetics can be spun that absolutely refuse to burn or that explode like gun powder, that refuse to absorb any moisture whatever or are more absorbent than soft linen. The possibilities of synthetics are limited only by the imagination of man.

In so broad field as synthetics naturally specilization is absolutely necessary. Here a new person entering the field is in an especially advantageous position for he is able in a good many cases to start right at scratch and in all cases should be able with only a reasonable amount of study and application to master the known knowledge in his field and start contributing to it. What other textile offers this to the degree found in synthetics?

It must be born in mind that in general synthetics will build upon the past experience of natural fibers. In one respect this is unfortunate since these synthetics can be so different, however there is no question that eventually machines, materials, and methods especially for synthetics will be evolved and they are going to be evolved, for the largest part, by persons who are not in that fitld today.

A little editorializing should not be out of place here. Be honest with yourself. Don't go into something in which you are not genuinely interested, whatever, you might bear in mind that as your knowledge of a subject grows so does your interest. I heard a noted psychologist say that you know you have found your chosen work when you can do it without apparent fatigue. Of course, he was speaking relatively but it is a good rule to apply.

Everyone starting out on a career is confused at first. The reason is simple. You cannot make palns or decisions unless you first have a knowlerge of the elements that are necessary. While this knowledge is being gathered and plans are being formulated (oft times subconsciously), there is one ideal

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Professor Dunlap Does Card Speed Research Work

By John J. McCarthy, '43

It is with a great deal of pride that we print this account of Professor Dunlap's research work in card speeds. We are sure that he is well known to all Clemson men studying in the Textile School at the present time, and to many of those who have gone out into the industry before us. Mr. Dunlap is Professor of Carding and Spinning, and he also teaches courses in Textile Mathmatics at Clemson. He has been on leave of absence for the past year doing work of a very important nature in several textile mills throughout the Southern States.

When the present national emergency arose a demand for maximum out-put was placed on all manufacturers in various industries. Every factory and mill in the Nation was asked to speed up production to rates far above their normal peace-time standards and to do it as quickly as possible. Cotton textiles are definitely playing a vital part in the war effort, and it was up to all cotton manufacturers to find ways of speeding up their production, and at the same time maintain the highest possible quality in their products. Quality fabrics are an asset to any manufacturer, and, what is more imperative at present, Army and Navy specifications must be met before the cloth can be accepted.

One of the possibilities suggested for increasing production was speeding up the cards. At first this idea did not meet with general approval, but it was finally decided to give it a try. Cards had been operating efficiently for years at the conventional and commonly accepted maximum speed of 165 r. p. m. Could we not increase this speed somewhat and still maintain the present efficiency? Would the quality of the yarns produced suffer because of these increased speeds? Endeavoring to answer these questions, arrangements were made to conduct tests in fifteen mills located in various sections of the South; the mills ranging in size from comparatively small ones to very large ones. It is logical to assume that fifteen mills, each in a different locality, varying in size, and each with its own equipment and manufacturing set-up would be able to provide information upon which authentic reports and from which definite conclusions could be drawn.

The research problem is under the sponsorship of The Textile Foundation, The Southern Textile Association, and The Arkwrights. Each of the mill tests are under the supervision of Mr. Dunlap, but are carried out by the personnel of the particular mill. The general aim of the project is to improve plant operations in the textile industry; this card speed problem being one of the phases of the general effort. After directing the procedure of each if the tests, Mr. Dunlap collects the data and correlates the results of the various mills. The experimental yarns and fabrics produced by the mills are taken to the laboratory and tested in order to determine the results of the mill tests. In all of the mills the increased card speeds were obtained by changing the size of the driving pulleys, which in turn caused a corresponding increase in speed of the various other moving parts of the card. The same settings at the card were maintained over the whole test period. The lap weights, silver sizes, and waste data were provided by tht mills, and the tests made on the resulting products were made by Professor Dunlap in the testing laboratory of the Clemson College Textile School. The yarns were graded against the appearance standards developed by the U. S. Department of Agricultural Marketing Administration, and which have been adopted by the American Society of Testing Materials.

Several factors determine whether or not it would be advisable to increase the speed of the card cylinder. In the opinion of the manufacturers themselves the following items should be taken into consideration; (a) condition of the cylinder bearings, (b) condition of the card clothing, and (c) the amount of vibration in the floor. Increased speed means additional wear on the bearing surfaces, added strain on th evarious parts, and more centrifugal force acting on the card clothing. The question was; could the machine stand the added strain? In one instance Mr. Dunlap was asked to run the experiment by one mill, but he refused to do so after inspecting the card clothing because it was in such bad condition. The results of these tests were amazing, in that the gains made were surprisingly above expectations. To give you some idea of the results obtained, here is some of the data from one of the mills. On the card running at 165 r.p.m. 9.92 pounds per hour were carded. Total waste on the card was 5.350 per cent. On the card running at 192 r.p.m. 11.84 pounds per hour were carded. Total waste on this card was 5.137 per cent. As one can see, here is an increase of over 19 per cent in pounds carded per hour. By observation we note, too, that the waste was cut down nearly 4 per cent (bases on the original waste of 5.350 per cent). One mill reported to Mr. Dunlap that as a result of increasing the

(continued on page fifteen)

Table 1.—Classification of Cotton and Other Mechanical Information

Mill	A		B	
R.P.M. of the cylinder	165 R.P.M.	192 R.P.M.	172 R.P.M.	196 R.P.M.
Staple of cotton	1-1/16″	1-1/16″	1-1/16″	1-1/16″
Grade of cotton	Western Mid.	Western Mid.	2/3 West. Mid 1/3 West. S.L.M.	2/3 West. Mid 1/3 West. S.L.M.
Pickers:				
Rear beater	Buckley	Buckley	Buckley	Buckley
Middle beater	2-blade	2-blade	2-blade	2-blade
Front beater	Kirschner	Kirschner	Kirschner	Kirschner
Cards:				
Relative humidity	57%	57%	51%	51%
Stripping schedule	3 per 8 hr.	3 per 8 hr.	3 per 8 hr.	3 per 8 hr.
Ounce lap fed	13.50	13.50	14.00	14.00
Grain silver delivered	49.88	50.71	52.96	53.83
Pounds carded per hour	9.92	11.84	10.20	11.69
Model (year)	1928	1928	1900	1900
Age of clothing	7 yrs.	7 yrs.	5 yrs.	5 yrs.
R.P.M. of doffer	8	9.3	9.6	11
R.P.M. of licker-in	407	475	460	525
Front plate settings:				
Top	.023	.023	.017	.017
Bottom	.023	.023	.022	.022
Drawing:				
Type	regular	regular	regular	regular
Processes	2	2	2	2
R.P.M. of front roll:				
Breaker	319	319	290	290
Finisher	309	309	290	290
Top rolls	cork	cork	metallic	metallic
Roving:				
Processes:	1	1	2	2
Super draft and H. R.	3.00 H.R.	3.00 H.R.	————	————
Slubber H. R.	————	————	.80 H.R.	.80 H.R.
Intermediate H. R.	————	————	2.09 H.R.	2.09 H.R.
Spinning:				
Type	long draft	long draft	long draft	long draft
Top rolls	cork	cork	cork	cork
Doublings	2	2	1	1
Yarn count	31s	31s	30s	30s
R.P.M. of spindle	9,900	9,900	10,200	10,200
R.P.M. of front roll	122	122	136	136
Ring diameter (inches)	1.875	1.875	1.75	1.75

Table 2.—Test Results

Card waste:	Per Cent	Per Cent	Per Cent	Per Cent
Motes and fly	1.056	1.103	1.567	1.580
Cyl. and doffer strips	.905	.710	.888	.684
Flat strips	3.389	3.324	2.507	2.107
Total waste	5.350	5.137	4.962	4.371
Silver variation:	Per Cent	Per Cent	Per Cent	Per Cent
Avg. max. variation per yd.	10.83	9.88	11.66	10.88
Max. variation in 20 yds.	20.00	21.11	25.55	25.55
	Count	Count	Count	Count
Yarn size(average of 100)	30.86	31.14	31.13	29.56
Strength:	Pounds	Pounds	Pounds	Pounds
Skein (corrected)	54.50	59.29	61.55	64.14
Skein (actual)	54.77	59.02	59.32	65.10
Single strand	.562	.604	.564	.602
Stretch:	Per Cent	Per Cent	Per Cent	Per Cent
In single strand	7.62	7.52	7.79	7.49
Yarn appearance:	Grade	Grade	Grade	Grade
Compared with standards	B−	B+	C+	B+

(Editor's Note: In both of these tests the breaking strength of the yarn increased when the speed of the card was increased)

Textiles in the War Effort

By L. H. Hance, '44

As the world stands today on the precipice of opportunity and gazes down into the valley of the future with the forces of the past pushing it from behind, it sees that it must think quickly in order to be able to react intelligently to the modern situation, lest it fall in failure in the unpredictable tomorrow. The industries of today are seeking to produce all they possible can to meet the government's needs in and "all out war." In the present limelight where is cotton? Where does the textile industry fit into the picture? Does today seem to bring shadows for tomorrow?

One has only to travel over the piedmont district of South Carolina and North Carolina to see immediately how quickly and earnestly America is responding in the textile field. During the past few months millions of yards of cloth have been ordered by the government, and these mills are rapidly adopting their own situation in order to produce as much cloth as the government needs and as quickly as the government demands it. Mills which had heretofore produced only sheeting have made quick change overs to twills and denim.

One of the biggest problems in change overs has been the difficulty of producing quality and yet getting a maximum production. An adaptable mill has probably found it possible to take orders and start production flowing without hesitation because it has been accustomed to doing so in the past. There are, however, hundreds of mills which have been caught in their old-fashioned setups which have necessarily required that they change their entire routines. Some mills feel that they face disaster, but rather than fall in ruin, they have bought what new machinery they could obtain and have gone "all out" for production. Each day brings some problem which the mill has not heretofore solved and must solve in order to exist. Some pessimists have dared to ask, "What will become of all these turnovers when the war is finished?" Will they bring failure? We say, "Definitely no!" These new problems which the mills solve in maintaining an increased production are presenting new ideas and angles far larger scale production which can easily be figured out for smaller scale.

The mills which have undertaken parachute fabrics, oil silk, and such materials are finding new and better substitutes for fibers which means increased economy besides longer durability in the future.

This production that the mills are endeavoring to speed up has presented a big problem in the upkeep of the mills. Since the government has taken over the steel and rubber industries, the mills are finding it hard to exist without new parts for their machinery. They are, however, learning to economize and to make the parts they need right in their on shops. This will definitely play a part in the future of the mill because after the war there will be less dependency on machine manufacturers and more economy in the mill itself.

Another problem that presents itself to the textile industry in war time is that of obtaining cotton for the manufacturing. Since the army has taken many of the farm laborers, the mills will find it difficult to get cotton from the farmers. This problem has sent the chemists searching for some synthetic fiber that can be produced cheaply and yet economically. The results of these searches will undoubtedly bring new and better materials for the future.

As far as we have been able to ascertain, the future for Textiles is much brighter than the average person thinks. The machinery and methods of manufacturing of tomorrow will be on a larger scale and on a more economical basis.

Textiles are playing a part in the war that cannot be overemphasized. Textiles must be speeded up for VICTORY.

—The Bobbin and Beaker—

Aralac Advances Rapidly

Aralac is a fiber which is obtained from casein, the protein constituent of milk. Chemically it is quite similar to wool, mohair, and fur; it looks and feels much like wool, having much the same texture and appearance. It is really a resin made from a protein base. Although Aralac is now in mass production and has been for some time, it has not as yet reached a stabilized chemical state, because the most desirable process which would give a fiber possessing the strength of silk and the softness of wool. The reason is that there are several different processes and varied chemical compositions possible. At the present time the producers of Aralac have selected the processes which give it the most outstanding properties required by the textile industry.

The source of the protein is cow's milk, the product resulting from a desire to find additional uses for dairy products. The milk is first put through a seperator to take the fat, as cream, from the milk. Then it is treated with an acid which curdles the milk and coagulates the protein leaving a substance called whey. The protein is separated from the whey and sent to the plant where the fiber is produced.

(continued on page eight)

A Parting Word to Clemson Cadets

By Major F. B. Farr

History has been a continuous record of man's struggle for liberty. Even in the early stone age there was found in the uncivilized mind of the savage a desire for freedom. This desire, like the little star of Bethlehem, has blazed the pathway along which the civilization of man has advanced. Where this God-given right of mankind has been denied, the wheels of progress have ceased their turning and proud walls of mighty empires have been leveled with the dust.

Freedom! Born beneath the sunny skies of ancient Greece before the Man of Gallileee enunciated the supreme law, "Thou shalt love thy neighbor as theyself." Freedom! Cradled in the England of the middle ages by those bold barrons, who at Runnymede, wrested the Magna Charta from a reluctant king. Freedom! Fostered in colonial America by a noble band of patriots who struck asunder the shackles of British despotism. And Freedom, forever established by fifty-five immortal Americans, who in 1787, in order to secure the blessings of liberty for themselves and for their posterity, did ordain and establish the Constitution of our United States. With the exception of that God-breathed revelation called The Bible, our Constitution is the world's greatest guide to an everlasting freedom.

Today America is totally involved in war against the Axis powers. Total warfare means more than weapons and machines, and more than the mobilization of the material resources of our great nation. It means the full employment of our human resources as well. It calls for vision and foresight in organizing the economic life of the nation to its maximum capacity while preserving and strengthening our democratic system. Defense of freedom and democracy calls for wise planning and the formulation of policies which look beyond the war. And our greatest resource of democracy in peace and in war is a vast body of free and determined citizens.

The conquerers of this civilization and the conquerers of all time will be those men and women who are not afraid to bend their knees and open their hearts to an eternal God.

Clemson men, the time has come when we must think and act not as individuals or as separate states, but as a nation. Firm, constructive hopeful, Christian leadership is what the world now needs. We must stand ready to fight and die if necessary to uphold the ideals upon which our nation was founded. This is the only way by which German aggression and Japanese imperialism can be destroyed.

Surely, Tigers, we will remain true to the memory of those embattled farmers who unfurled their flag on Concord bridge, to those immortal Americans who laid the foundation for the most powerful and successful government on the face of this earth, and to those who for the Stars and Stripes are today giving their lives across the seas. And with the spirit of our Constitution in our hearts may we breathe its freedom, live its principles, pledge our lives to its support, and pass on to the American of tomorrow a land of law, of liberty, and of peace. And in passing on this priceless heritage, let us hope that a world-wide assembly may someday be forced to bear into its legislative halls our same Constitution, and that our children, still dwelling beneath the proudest flag that floats on land or sea, may with Tennyson welcome that glorious day "When war drums throb no longer and battle flags are furled in the parliment of man the federation of the world," and say with Markham, "Let mercy speed the hour when swords shall cease and men cry back to God, 'there shall be peace.'

—Bobbin and Beaker—

ARALAC ADVANCES RAPIDLY

(continued from page seven)

Here the dry protein is mixed into a thick, viscous syrup, forced through spinnerettes, and then coagulated into a filament. After the filament is formed it is chemically treated in order to fix its dying qualities, and to give the fiber other desirable characteristics. After these reactions are complete the resulting product is a resin fiber which has the dying qualities and characteristics of animal fibers.

Aralac has made a very successful debut in textiles, and it is destined to become just as important and extensive in the industry with regard to wool-like textiles as rayon has become as a competitor of silk.

It has developed much more rapidly than the time taken to put the cellulose fiber where it is today. By the same token, Aralac must be quicker to adjust itself to the needs of the textile industry; and this it seems to have accomplished at this comparatively early stage. It has been blended with cotton, wool, rayon, mohair, and other combinations of these fibers, to produce excellent style fabrics; it has been used up to as much as fifty percent in blending. It may be cut into any fiber length up to six inches. Recently it has been used in making blended yarns for knitting.

—The Bobbin and Beaker—

Lt. Gordon E. Williams, Jr., Quartermaster Corp. U. S. Army, was a recent visitor on the campus. Lt. Williams, editor of THE BOBBIN AND BEAKER in 1941-42 is now with the 69th Quartermaster Battalion, Camp Clairborne, La.

Mill Power Supply

By John J. McCarthy, '43

In the management of a textile mill the cost of power is one of the most significant items of expense. Without the correct amount of power production would be seriously hampered, as one can see. Therefore it behooves the mill executive, and the future executive, to know something about the cost of power and its economical use. With this point in mind we give you here a short discussion on the intelligent analysis and application of electrical machinery, since this type of machinery is the chief means of distributing power in the mill. We have heard students ask why it is necessary for them to study the subjects of electricity and other related engineering topics; here is the answer. One can not understand the operation and application of electrical machinery unless he is familiar with the fundamentals of electric motors and the peculiar characteristics of an electric current.

When selecting a motor to drive some piece of machinery it is necessary to analyze the situation thoroughly before buying the motor. The length of time the motor is to run each day without stopping, the average power demands made on the motor, and the peak power demands, must be determined before the motor is selected. For example, instances have been cited in selecting a motor for a loom, where the user judged the quality of the motor by the number of picks obtained in comparison with another motor operating on the same type of loom with the same size gears. If the new motor gave less picks it was judged inferior, and if it gave more picks for the same length of time it was judged superior. Experiments have shown that in many cases the loom giving fewer picks was still the better motor in over-all performance; the difference in the number of picks being made up by changing the gear ratio to conform with the speed of the motor.

In other cases the loom motor was selected on the basis of the average power demands of the loom. It has been shown by analytical tests that the average power demand is not an accurate measure to use when purchasing a loom motor, but that the peak power requirements and the periodic pulsating surges of power in a loom, which are now being considered in loom motor design, must also be considered if the most economical and efficient performance is to be obtained.

Choice of Size of Apparatus

Obviously, it is unwise economically to use a 25 hp motor to drive a machine requiring only 10 hp. Not only the capital investment would be high, but at such a small fraction of full load the full-load efficiency of the motor would be poor. In the case of an induction motor the power factor at small fractional loads would be low. By experiment and graphical studies it ha sbeen shown that motors of fractional horse-power have a very high purchase price per horse-power, and that motors of higher power rating have much lower purchase prices per horse-power. It seems to be not so much the amount of material going into the motor as it is the cost of labor in building the smaller motor which causes the difference in price. For example, in a polyphase induction motor of normal torque the cost of 10 hp in 1 hp motors is $39.00 x 10—$390.00, while the cost of the same hp in one 10 hp motor is only $120.00.

Group Drive vs. Individual Drive

This matter of several small motors or one large one brings up the question of group drive vs. individual drive. Ther eseems to be no hard and fast rules governing one method or the other for every application. Each situation has its one factors, and rarely are they applicable to another instance. In each case the advantages and disadvantages must be considered. As a general rule a saving can be made by using a group drive in the following cases:

1. Where there are compact groups of constant-speed machines which are to be run continuously and simultaneously.
2. In cases in which compact groups of machines which, because of their diversity of load may be driven by a single motor of much smaller rating than the combined capacities of the motors required for individual drives.
3. Where groups of constant-speed machines with heavy peak load demands might require individual motors of a size much in excess of the average running load.
4. Where motors required for individual drive are small.
5. If in changing over an existing installation the old system of line-shafting may be used as already installed.

Under some conditions, however, the initial cost will be less with individual drives when:

1. The machines are isolated and the line shafting is impracticable.
2. The roof construction will not safely support line shafting and the floor structure does not permit hanging the line shafting beneath it.
3. The speed of the machine must be independently variable.
4. It is necessary to move the machines from one location to another frequently.

In addition to the above mentioned considerations it should be remembered that with a group drive there will be many open belts from ceiling to floor which present some hazard to operatives. The ap-

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Rayon vs. Cotton in Tire Cord

By T. Arnold Turner, Jr., '44

America's army is rolling to war on rubber and rayon. Rubber has commanded the public's attention, because of the acute nationwide shortage. A. newly developed type of rayon has been conserving many precious tons of rubber.

Tough fibers of this new rayon lie beneath the outer layer of rubber skin of military and civilian tires. Possessing greater strength than any other fine fabric and keeping its great strength under the high heat of heavy duty driving, this rayon fiber permits tires to have thinner but stronger walls, adds thousands of miles to their life, and reduces the amount of rubber going into the tire.

This high strength yarn, developed by E. I. du Pont de Nemours and Company, must take an unbelievable amount of punishment By the way, the new trade name for this high tenacity fiber is called "Cordura." The large tires of the heavy bombers are required to stand up under the jolt of tons of metal landing at high speed, without a blowout. The combat car, called the "jeep", is driven over the roughest terrain, but the Army demands as well that the combat car tire have sufficient structural strength so that if punctured it can run flat for many miles until its mission is complete.

Ordinary rayon is usually made from the cellulose of purified wood pulp. "Cordura" high tenacity rayon is made from the cellulose of cotton linters which are the short fibers remaining on the seed after cotton is ginned. However the different raw materials used are not as important as are the steps in the process of making this unusual yarn. The increased strength is mainly due to stretching the filament immediately after it is formed. The final product, made under careful chemical and physical control, and the correct amount of stretching, is a filament having a tensile strength of 70,000 pounds per square inch. For its size, the rayon cord tire has a skeleton as strong as the skeleton of a skyscraper.

The chief advantage of this new rayon is that heat does not sap its strength as in cotton cords. Consequently, it can be used more sparingly in building a tire. Rayoncord tires run on an average of 15 percent cooler than other tires. Because the rayon cord tire lasts longer, it has a great economical value in that it can take a thicker tread and can also be re-treated more times.

The lighter weight tire made possible by rayon cords is of particular importance in aviation where the tire is needed only for taking off and landing and is simply extra weight during the flight. Obviously, the saving of tire weight, to give more sky mileage or to make room for more guns and bombs, is of tremendous importance in military planes.

Of course, whenever there is a new idea, invention, or patent, there is always an industry or manufacturer who opposes its development in defense of older methods which have been in use for many years. This new high-tenacity rayon is now in this stage of development. The cotton manufacturers are now engaged in a heated argument with Walter M. Jeffers, the newly appointed rubber czar in the United States.

The National Cotton Council has charged that the proposed expansion of the rayon cord tire program threatens "serious injury and injustice" to cotton's largest market. They contend that the rayon expansion program is being launched while tests of cotton vs. rayon cords still are under way, and in the face of preliminary evidence that such a program is neither necessary nor justified by the war effort.

President Iscar Johnston of the National Cotton Council points out that the War Production Board has already put into effect a program which would quadruple the output of rayon.

"This matter of rayon tire cord expansion was first agitated solely on the basis that rayon cord, being then in use, would save rubber," Mr. Johnston said. "The cotton mills, in cooperation with some of the rubber companies, promptly produced a thinner cotton cord which was proved by tests to save equally as much, and in some instances more rubber than could be saved with the rayon cord.

"Then the question of satisfactory performance of the thinner cotton cord was raised. Army tests were made by the Motor Transport Corps, and this question of performance had to be abandoned just as the rubber-saving argument was abandoned."

"The last question raised was that synthetic rubber generates more heat than natural rubber and that rayon might be necessary on this ground. Preliminary tests have indicated that this contention is a fallacy, yet the requirements committee proposes to rush ahead without waiting for the final results."

Tire cord constitutes a market for cotton which is larger by nearly 50 percent than any other.

And then, too, the abundant raw materials and manufacturing facilities are available to provide cotton cord immediately. The rayon expansion program would require approximatel nine months of time, thousands of tons of steel and hundreds of thousands of manhours before it could become operative.

The use of rayon instead of cotton in the manufacture of tires will probably force the smaller tire manufacturing companies out of business. The patents on the rayon process are owned by the U. S. Rubber Company and the Goodyear Tire and Rubber Company, two of the "big four" vested interests.

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Textile Faculty Members Called Into the Service

Additional burden placed on professors, but problem being solved.

THE TEXTILE SCHOOL FACULTY

Front row, left to right: D. P. Thomson, J. V. Walters, E. F. Cartee, A. E. McKenna, Joseph Lindsay, Jr. Back row, left to right: T. A. Campbell, Jr., W. G. Blair, Gaston Gage, E. P. Ward. Not pictured are H. H. Willis, Dean, R. K. Eaton, I. S. Pitts, and W. B. Williams.

On returning to Clemson this year, the textile students were faced with seriousness of the problem of a reduced faculty due to the present conditions of a world at war. During the summer, two of the members of the textile school faculty were called into active duty in the United States Army. Their positions as yet have not been filled by new men but are being temporary filled by the remaining members of the faculty and two seniors in the school of Textile Chemistry.

Lieutenant M. L. Huckabee, formerly a professor of Textile Chemistry at Clemson, was called into active service in June and is now with the Chemical Warfare Service, Grant Building, Atlanta, Georgia. Lt. Huckabee graduated from Clemson with a B. S. degree in Textile Chemistry in June, 1933. Since that time he served as a member of the faculty of the Textile Chemistry Department until being called into the Army.

Lieuaenant W. E. Tarrant was the second member of our faculty to be called into active service during the summer. While at Clemson, Lt. Tarrant was assistant professor of Weaving and Designing. He is now stationed at the Officer's Training School, Naval Air Station, Miami, Florida.

The loss of these two men at a time when no one can be found to replace them has worked a hardship on the remaining members of the faculty of the textile school. They have been forced to add extra classes to their already strenuous schedules in order to give the students a complete course in textiles.

In the Textile Chemistry department which now has a faculty of only two professors, two senior textile chemistry students are employed as laboratory assistants. Their duties are to assist the professors in the teaching of laboratory work. This is done so that the professors may have more time to assume the duties of Lt. Huckabee. In the department of Weaving and Designing, the duties of Lt.

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The Editor's Page

AGAIN, WE SAY, "THANK YOU!"

The Bobbin and Beaker was organized in November, 1939, by members of Iota Chapter of Phi Psi, national honorary textile fraternity at Clemson. The first issue of the magazine was published in March, 1940. A copy of the magazine was given to each textile student at Clemson, and a copy was mailed free-of-charge to every textile plant in South Carolina, North Carolina, and Georgia. Recently, many mills of Alabama have been added to our mailing list.

Two years ago, Dean Willis gave the staff of The Bobbin and Beaker a room just across the hall from the Phi Psi room in the textile building.

Again, we wish to say that we appreciate the cooperation of Dean H. H. Willis of the Clemson Textile School, and of the Clemson College Business Manager and his staff who have rendered practical advice and aid. We appreciate the article by Mr. John T. Wigington and also for his very sincere interest in our work. We are grateful to Mr. C. W. Bendigo, for his contribution to the magazine. We thank the students for the articles they have written and also those students who have always been willing to render any assistance possible.

Last, but by far not least, we thank those advertisers who make the publication of the magazine possible by advertising through The Bobbin And Beaker, and we sincerely hope that our services will prove as valuable to you as yours have to us.

—M. D. M.

—The Bobbin and Beaker—

REORGANIZATION OF COURSES EFFECTED

Last summer the Clemson College Textile faculty undertook the reorganization of textile courses at Clemson and the preparation of textile teaching material especially adapted to the ever-changing conditions of the industry. The work was carried on in cooperation with the Textile Foundation and deals largely with weaving subjects alone. Since no students are majoring in Weaving and Designing, there is room in advanced subjects of Weaving and Designing for those students who desire these advanced subjects.

—The Bobbin and Beaker—

INTERMISSION PARTY A SUCCESS

The Phi Psi Autumn Ball intermission party, held last Saturday night was a most enjoyable party. Some of the old grads, who were here for Homecoming, were present and seeing them again was a ral pleasure. Among the guests was Ray Herbeck, whose popular orchestra played for the Autumn Ball week-end series.

A CHALLENGE TO FRESHMEN

Ever since your enrollment at Clemson in the class of '46, you all have been urged to study and to work hard, and to do your best to successfully complete your college education. You have been told that these are hard times, uneasy times, and also that only the strugglers and the workers will find themselves among the group who are most likely to succeed. We, as the Textile students who have gone through a little more than you all have, urge you to listen to this advice, and to do your best to make these four years at Clemson mean something to you, your parents and your friends.

Being members of the Textile school, you all have a fine opportunity to become members of a number of honor fraternities. These fraternities are within everyone's reach and they should be the goal for which you are setting yourself. College means much more than getting a degree after four years it means and represents four years of association with the boys who will be your friends, pals and companions throughout your life. These fraternities offer you the chance to make lasting friendships of the highest caliber.

The first fraternity which has its doors open to you is Phi Eta Sigma. It taps new members at the end of the first semester of the Freshman year, and at the beginning of the Sophomore year. A grade point ratio of 7.5 is the requisite. Rather high, isn't it? But others have done it. Why can't you?

Phi Psi, the national honor textile fraternity, is next on the list, and this organization should interest you all more than any other. It is your fraternity; the fraternity of the Textile students. Members are tapped at the beginning of the Junior and Senior year, and some are taken at the end of the Junior year. The highest Sophomore is taken in at the end of his second year, only one from the entire school. Grades, character and activities are a requisite for Phi Psi.

At the beginning of your Senior year, you may be asked to join Phi Kappa Phi, honor scholastic fraternity with chapters all over the nation. A grade point ratio of 6.5 is the only requirement.

These are only three fraternities of which you may become members, but don't forget Blue Key, Tiger Brotherhood, Scabbard and Blade, Who's Who and scores of others which are only too happy to increased their enrollment. No one has ever regretted his action by joining these organizations, and none ever will.

They are all "top" fraternities and need "top" men if they are to carry on their work. Why not be one of those who can be called the "top" man.

—B. A. C.

PHI PSI
Assumes Prominence on the Campus

THE HISTORY OF PHI PSI
By B. A. Chestochowski, '43

The Phi Psi Fraternity was founded by five students of the Philadelphia College of Textile Engineering on March 18, 1903 for the purpose of promoting good fellowship, social intercourse, mutual advancement of its members and the art of textile manufacturing. In 1905 the Fraternity was incorporated under the laws of Pennsylvania. Beta Chapter was organized in 1904 at the New Bedford Textile School, New Bedford, Massachusetts, and the same year Gamma Chapter at the Lowell Textile School, Lowell, Massachusetts was admitted into the fold. Delta Chapter was organized at the Bradford-Durfee Textilt School at Fall River, Massachusetts in 1909.

In May, 1942, Eta Chapter was formed at the North Carolina State College, Raleigh, North Carolina, and on January 10th of the following year, 1925, Theta Chapter was organized at the Georgia Institute of Technology, Atlanta, Georgia. In May, 1927, the Iota Chapter of Clemson College was given a Charter.

Phi Psi Fraternity is the largest and most respected textile Fraternity in the world, and its alumni hold some of the highest positions of trust and respect in all branches of the industry.

The Iota Chapter of Clemson College basis its membership upon scholarship and activities, taking into its fold only the top ranking men of the Textile School. The Textile Chemists, Textile Engineers, Weaving and Designing students as well as the Textile Industrial Education men are all eligible for membership.

During the World War I the Fraternity service flag contained one hundred and sixty-four stars; seven of which were turned to gold. World War II has more than doubled that number to date, and reports state that some gold stars have also been added. The Iota Chapter has added perhaps more than any other Chapter to this number of men in the services, because of its military organization.

—The Bobbin and Beaker—

PHI PSI ACTIVITIES
By B. A. Chestochowski, '43

Following its usual procedure of inducting new members at the beginning of each semester, the Iota Chapter recently added to is fold five new Juniors and six Seniors. The Juniors are Davis, J. W., Hunter, J. R., Hawkins, F. J., McArthur, J. D., and Whisonant, W. L. The Seniors, the last batch of the class of '43 to ever receive membership, are Allen, D. F., Clanton, C. P., Cornwell, J. A., McCarthy, J. J., Pitts, P. L., and Templeton, W. D.

The initiation of the new members consisted in the usual carrying of the shuttle and dyed skeins, and the initiates were required to reorganize the old members with a shuttle salute. The anti-rough proceedure was climaxed by a written exam which was required of each initiate. The exam covered the By-Laws, Constitution and Rituals of the Fraternity.

The final degree will be held in the near future at which time the newcomers will receive their Fraternity pins and shingles, thus signifying their acceptance into the national organization. A formal installation will take place at a banquet following the final degree.

New members will be chosen at the early part of the next semester, and these will consist of the top ranking sophomore of the Textile School along with a number of the top Juniors.

At the latter part of the past semester the new officers of the Iota Chapter were elected consisting of Charles R. Howard, President; Thomas E. Croxson, Vice President; Lang S. Ligon, Senior Warden; Morris D. Moore, Junior Warden; and Laconla H. Hance, Secretary and Trasurer. They assumed their respective offices following the banquet at which they were chosen.

Charles R. Howard, textile chemist from Augusta, Georgia, succeeded Jim Barton, textile engineer from Anderson, S. C., who is at present with the Quartermaster Corps of the U. S. Army.

—The Bobbin and Beaker—

PHI PSI SERVICE FLAG

One of the first projects to be undertaken by the Fraternity at the beginning of this semester was the making of a Fraternity Service Flag. The flag will be made entirely by the student members of the chapter including the dyeing and cutting of the field, borders and the stars.

All the chapter members who are now in the armed services of the country will be represented by a blue star, and in the event of death a gold star will be substituted. To date no actual number has been obtained as yet, but a survey is well under way to determine the total number of stars which will decorate the flag.

The flag upon completion will be draped on the South wall of the Phi Psi Fraternity room in the New Textile Building, where it will remain for the duration.

Textile Graduates Serve in the Army

Note: (The addresses of the men listed below are at present unavailable. Anyone knowing the address of any of the following men will be doing us a favor by informing us as to their whereabouts.)

Lt. Wallace Milton Ackerman
Lt. Hunter Septimus Ackis
Pvt. William Augustus Barnette
Lt. James Harleston Barton
Lt. William Hester Woods Baker
Lt. Jack Kuykendall Benfield
Lt. Robert Saye Berry
Lt. Thompson Stokes Boland
Lt. Jones Edward Bolt
Lt. Ray Charles Boswell
Lt. Henry Bradford, Jr.
Lt. Henry Leroy Buchanan
Lt. Wade Hampton Carder
Lt. Thomas Clayton Cargill
Lt. Thomas Clayton Cargill
Lt. William Hunter Carson
Lt. Fountain Gray Cash, Jr.
Lt. Joseph Lewis Cox
Lt. John Augustus DesPortes
Lt. Robert Francis Drennan
Lt. Edward Ervin DuBose, Jr.
Lt. Grady Milford Dunlap
Lt. Beoron Autrell Fletcher
Lt. Francis Nicholas Fortunato
Ensign Fred M. Fox
Lt. William Copeland Gilmore
Lt. James Hughes Godfrey, Jr.
Lt. Nelson Vereen Gore
Lt. Frank Johnson Haddon
Lt. Jack Edward Hamilton
Lt. Grover Cleveand Henry
Lt. Robert Allen Hickerson
Lt. Donald Neal Hill
Lt. Charles Welcome Hite
Lt. John Wesley Howard
Lt. Julius Clifford Hubbard
Lt. Nelson Jackson, III
Lt. Lake Hugh Jameson
Lt. Ralph Cameron Johnson
Lt. Albert Eugene Johnston
Ensign John Dargan Jones
Lt. Charles William Kay
Lt. John Granberry Kelly
Lt. George Walker Kirby
Lt. Thomas Simpson Klugh
Lt. Evans Allen LaRoche
Lt. Wattie Smith Ligon
Lt. James Burton Lindsay
Lt. William Henry Lowe
Lt. Paul William McAlister
Lt. William Thomas McCoy
Lt. Norwood Reaves McElveen
Lt. James Fleming McMaster
Lt. Joe Fred McMillan
Lt. Henry Smith McNair
Lt. Anderson Chase Nalley
Lt. Richard Thacker Osteen
Lt. William Robert O'Shields
Lt. Benson Clayton Parrish
Lt. Thomas Eugene Peterson
Lt. Clarence James Pope
Lt. McKinney Hurt Ramsey
Lt. DeWitt Javan Ross
Lt. Woodrow Fernon Sanders
Lt. William King Shirley
Lt. Mitchell Forrest Simmons
Lt. Heyward Vance Simpson
Lt. Richard Newman Steele
Lt. Harry Lyle Sturgis
Lt. John Willis Sullivan
Lt. Arthur Ehrich Thomas
Lt. John Lester Thompson
Ensign Charles Allen Turner
Lt. George Sims Wham, Jr.
Lt. Gordon Edmund Williams
Lt. Harold Betts Wilson.

—The Bobbin and Beaker—

RAYON VS. COTTON IN TIRE CORD

(continued from page ten)

Elliot F. Simpson, former counsel to the House sub-committee on rubber, says that as early as last June he had been informed that "the big four were using strenuous efforts to push rayon tires, knowing full well that the smaller companies would be forced out of business if the war department adopted rayon for tires as standard."

In the above article the writer has endeavored to present both sides of this very important issue, and has left the decision entirely up to the reader. Of course we cannot settle this controversy here, but the fact remains that we are in a struggle for our lives, and what the W P B in Washington orders, we must obey. We feel confident that Mr. Jeffers will adopt the best possible plan with just consideration to both sides.

—The Bobbin and Beaker—

Lt. J. L. Thompson, Textile Engineering graduate of 1941-42, is now with the Quartermaster Corp., and is stationed at Camp Gordon, Augusta, Georgia. On his recent return from Quartermaster duty in Wyoming, Lt. Thompson was married.

Our hearty congratulations and best wishes, Lester!

PROFESSOR DUNLAP DOES CARD SPEED RESEARCH WORK

(continued from page five)

speed of their cards they were able to eliminate overtime pay. Here is the confirmation of both increased production and decreased costs.

This project of Mr. Dunlap's is very significant because it indicates that the textile industry, and the men who are associated with it, are becoming more conscious each day of the need for research. Textile research has provided many amazing new products, and improved methods in the past few years. New products, new methods, and original styles and fabric blends must be brought out by the manufacturers if they are to successfully compete with their fellow producers, and this applies even more so to the synthetic fiber producers. The writer has observed that there is something new being discovered all the time; to varify this one has only to scan the contents of the various textile magazines. Some mill men warn that there is coming a day when the mills must be completely modernized, or else they will be doomed.

Cotton Covering on the Slasher Squeeze Rolls

Professor Dunlap also informs us that he has under way an experiment to determine whether or not cotton can be substituted for wool on the squeeze rolls of the slasher. At present wool is very scarce, and the cost is very high. In one mill where Professor Dunlap substituted cotton blanketing for the wool roll covering, it was found that the cotton covering was not only very much more economical, but it lasted longer than the wool covering and at the same time did satisfactory work in preparing the yarn for weaving. The only obstacle which seemed to offer difficulty was the fact that the cotton fabric matted down and became hard with continued use. However, Mr. Dunlap maintains that if the cotton fabric could be taken off the roll at certain intervals and be washed it would prove very satisfactory.

We have printed here all the tabulated data on the manufacturing conditions, the characteristics of the yarn itself, and the data obtained from the tests on the yarn carried out in the Testing Laboratory of the Clemson College Textile School.

Thus, research brings forth new fruit in its never-ending toil for the betterment of our living standards. The job is being well done, Professor Dunlap, we of the Textile School congratulate you.

—The Bobbin and Beaker—

CHOOSE SYNTHETICS

(continued from page four)

rule to follow: do the best you know how on the job you are doing and study to do it better.

You who are now in school have often heard it said that you should take advantage of your opportunities while in school. Perhaps that isn't sufficiently clear. Perhaps it should be stated that the way you do your job in school represents the training you are giving yourself as a foundation for your future. For you in textiles who will continue in this field, the record you are now making is one that you will either have to live up to or try to live down, for many years to come if not for the remainder of your natural life. That may sound strong and you may automatically say in your mind, "There are exceptions and I will be one of those exceptions," but the chances are several thousand to one that instead you will be one of those for whom the rule holds true.

Those of you who are also taking military training with your textile and see the certainty of entering the armed service of this country may be tempted to minimize the importance of your education in regard to textiles by consciously or unconsciously saying that by the time the war is over and you return to normal living so many things in textiles will have changed. That is confusing the main point which is that you will not have changed. And it will be your relationship to the industry rather than the industry's relationship to you that will be of greatest personal importance.

—The Bobbin and Beaker—

TEXTILE FACULTY MEMBERS CALLED INTO SERVICE

(continued from page eleven)

Tarrant have been divided among the remaining members of the faculty of the department. None of the faculty of the Yarn Manufacturing department has as yet been taken from the school.

The faculty of the Textile Chemistry department is now composed of two professors, Mr. Joseph Lindsay and Mr. E. P. Ward, and two student assistants, Cadet C. R. Howard and Cadet T. E. Croxton. The four men on the faculty of the Yarn Manufacturing department are Mr. R. K. Eaton, Mr. W. G. Blair, Mr. Gaston Gage, and Mr. D. P. Thomson. Mr .Thomson was added to the faculty last year when Mr. G. H. Dunlap was given leave of absence to conduct research work for the Southern Textile Association and the Arkwrights. Mr. A. E. McKenna, Mr. W. B. Williams Mr. T. A. Campbell, Mr. J. V. Walters, Mr. E. F Cartee, and Mr I. S. Pitts are the remaining members of the faculty of the Weaving and Designing department.

We, the textile students, saw the problem facing our school and we have seen this problem solved rapidly and efficiently. We are very proud of the fact that the faculty is cooperating to the highest degree possible to maintain the reputation of our school as one of the leading textile schools in the nation today.

The Manufacture of Tapestries

By T. Arnold Turner, Jr., '44

As you all know, tapestries are pictures or designs which are made by interweaving colored "woof" or filling threads with undyed warp threads after the latter has been extended either vertically or horizontally upon a loom. This interweaving is done by means of an instrument known as a "broche" which is neither a shuttle nor a bobbin but works like both of them. Needles are never used in weaving tapestry. Art tapestries can only be woven by trained artists who always interpret and never copy a model. If a slight mistake is made in the process of weaving, there can be no alternative but to destroy what has already been done and start all over again. There is no similarity in hand-woven tapestries and machine-woven tapestries. Every thread of the warp is so completely encased by the filling that warp does not show on either side of the fabric. There are two kinds of tapestries: "haute-lisse," in which the tapestries are woven on an upright loom, and "basse-lisse," in which tapestries are woven on a horizontal loom. This simply means that the warp is streached like the strings of a harp, usually twenty-two to twenty-six to an inch, but one, the "haute-lisse," has its warp turned vertically while the "basse-lisse" has its warp turned horizontal to the ground. Keep in mind that all of the "real" tapestries are woven by hand. The Gobelin Tapestries, most famous of tapestries, are woven on the "haute-lisse" looms, but the "basse-lisse" looms are about one-third faster than the "haute-lisse."

In high art "haute-lisse" tapestries, well filled with figures of people, the artist weaver can weave only about one square yard in a year! At the famous Gobelin factories today, this square yard cost about eight hundred and eighty dollars, which does not include taxes, insurance, and salary of the weavers! Nero, the great ruler of Rome, once paid two hundred thousand dollars for one yard by two yard tapestry . The weaver passes from one color to the other by using the intermediate colors so as to produce a design that looks as if it were painted on the warp. This process is called "hatching the colors," and is the most difficult task in tapestry weaving.

In both "haute and basse-lisse," the weaver works on the back side with the finished part facing away from him instead of toward him. The "haute-lisse" weave has to go around to the front of the tapestry in order to inspect his choice of colors, etc. Neither can the "basse-lisse" weaver inspect his work without going to a great deal of trouble also. The "haute-lisse" tapestries usually bring a higher price because the artistic shading is better than the "basse-lisse" tapestries.

The precautions taken by the weaver to verify the correctness and excellence of his work are of little advantage if he dosen't possess the talent, skill, and experience to insure success in his tapestries. Let it be brought to mind that he uses dry and supple materials which cannot be manipulated as readily as the liquid colors of the painter. He cannot correct, alter, or modify what he has done. Neither can he erase and reproduce it, as the painter. He cannot create harmony of colors except with the difficult task of "hatching" the right colors together; first, in his mind, then, on the warp. Is it any wonder that it takes 1 to 15 years to educate a weaver into all the tricks of the profession? It took several generations of the Gobelin family in France to perfect the art of storied tapestries. Since the design is first drawn on the face of the warp, the weaver reproduces it in the reverse. After the tapestry is finished no one can tell which is the face of the cloth with the naked eye.

Some of the oldest existing tapestries are no doubt the fragments from the Church of Saint Gereon in Cologne, which were woven in Europe in the 11th or 12th century. The oldest of all existing tapestries was woven in Asia four hundred years B. C. and was found in Crimea. These early tapestries were usually worn on costumes for decorative purposes.

Everywhere they occupied the places of honor. Great Generals carried them to the wars; houses were decorated with them to create warmth and congeniality in the homes.

In France and Flanders, the manufacture of tapestries became nationalized. The most important weavers of France and of the world were the Gobelins. Incidentally, the factory still produces magnificent pieces of art. In 1662 the factory at Faubourg Saint Marcel was purchased by Colbert on behalf of Louis XIV. This manufacture is still carried on by the state.

There are only two museums in Europe devoted to the exhibition of tapestries and textile products exclusively. These are the Gobelins in Paris, and the Crocelta in Florence, Italy. In each museum there are over six hundred or seven hundred pieces of tapestry arranged to show the modifications at different epochs of weaving.

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Seneca, South Carolina

MILL POWER SUPPLY

By J. J. McCarthy '43

(continued from page nine)

pearance of the room and the working conditions are improved somewhat when the individual drive is used.

The higher efficiency of the group drive is decreased somewhat by losses in shaft bearings and the slippage in the belt drives. There may be a saving in power costs with a group drive when the maximum demand for billing purposes is based on connected horse-power.

Thus it might be necessary because of peak loads to provide a 10 hp motor to drive a given machine. Ten such machines would require ten motors for individual drive and the demand would be based on 100 connected horse-power. It might be possible to arrange these machines for group drive and use only a 40 hp motor if the peak loads did not overlap seriously in the time of their occurances. Thus, the demand charge for group drive would be only .4 of that for individual drive.

Load and Power Factors

The load factor of any mill is the ratio of the average power used in a given period to the peak power used in that period. The cost of power will be effected considerably by this load factor. A mill having a low load factor will be charged a higher rate by the power company, because the latter is required to have equipment at hand ready to supply the mill's peak requirement. Naturally this condition is going to result in an increased monthly power cost. It is to the advantage of the mill to arrange the various operations so that the peak load will be as close as possible to the average load.

Reference has already been made to the power factor. Power factor is the ratio between the actual power used by the mill and the generating capacity required to produce it. Penalties are imposed upon the mill by the power company if the power factor is low. Therefore, the management should strive to keep it as near to unity as possible. Power companies use the power demand of the mill as a basis for the bill, and at the same time they place a power factor charge if the factor is low. A consumer having a maximum demand of 100 kw. with 100% power factor would be paying the same demand charge as if he had a power factor of shall we say 50%. However, the kilovolt-ampere capacity in generating and distributing equipment required by a 100 kw. load with 50% power factor is approximately two times as great as that required for 100 kw. with 100% power factor. So, in addition to the demand charge there must be a penalty against low power factor.

The economical use of electrical apparatus demands the intelligent analysis of the many problems which are common to mill engineering in general. Some require the attention of a competent electrical engineer. There are problems involving efficiency, economic life, and other items relating to operating costs. Due attention to these problems will help considerably in maintaining a smoothly running, economical mill.

—The Bobbin and Beaker—

THE VALUE OF RESEARCH TO THE TEXTILE INDUSTRY

(continued from page three)

dew-proofing preparations, permanent water-repellent fabrics and many other products commonly used today.

The textile schools, through their graduates, are playing an important part in the development of the research program in many of our mills. Graduates in textile chemistry and engineering, in textile engineering, in yarn manufacturing and in weaving and designing have brought to the industry much needed technical training and many new ideas that have replaced rule-of-thumb methods heretofore practiced. The research laboratories of our textile schools are rendering a real service to the industry particularly to those mills which have not yet established such research departments.

The federal government, through the Cotton Branch of the Agricultural Marketing Administration, the Bureau of Agricultural Chemistry and Engineering, through the Southern Regional Research Laboratory, the National Bureau of Standards and the Textile and Clothing Section of the Bureau of Home Economics, is doing a very thorough job of establishing standards for many cotton textiles, as well as pursuing a fundamental program of fiber and spinning research. The Textile Research Institute, Inc., the Textile Foundation, the Southern Textile Association, the National Cotton Council and the Cotton-Textile Institute, Inc., and many private and public institutions are contributing much to the cotton research work being conducted in this country.

It is interesting to note that an increasing number of cotton manufacturers report today that their research departments are paying their way. Aside from developing new uses such research departments have accomplished many other notable achievements especially in the field of selection. As a result of research, products used in manufacturing are being chosen on the basis of their proved superiority for a given use. The following are some of the outstanding selections in the textile industry with respect to quality and fitness to function.

1. Selection of cotton, resulting in not only a better product but better running work and a lower manufacturing cost.
2. Selection of oils and greases.
3. Selection of size materials, gums, and starches.
4. Selection of repair parts.

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USEFUL DATA

These data and formulae were compiled for your benefit. We suggest that you cut this page out and place it in some convenient spot where it may be easily referred to. Additional data will be published in future issues; save them for your benefit.

To find circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find the area of a circle multiply square of diameter by .7854.

To find the area of a triangle multiply base by one-half the perpendicular height.

To find the surface of a ball multiply square of diameter by 3.1416.

To find cubic inches in a ball multiply cube of diameter by 5236.

Doubling the diameter of a pipe increases it's capacity four times.

To find the pressure in pounds per square inch of a column of water multiply the height of the column by .434.

To find the capacity of tanks of any size; given dimensions of a cylinder in inches, to find it's capacity in U. S. gallons: square the diameter, multiply by the length and by .0034.

Millimeters × .03937 = inches.

Millimeters ÷ 25.4 = inches.

Centimeters × .393 = inches.

Centimeters ÷ 2.54 = inches.

Meters × 39.37 = inches. (Act Congress)

Meters × 3.28 = feet.

Meters × 1.094 = yards.

Square Millimeters ÷ 645 = square inches.

Square Centimeters × .155 = square inches.

Cubic Centimeters ÷ 16.387 = cubic inches.

Cubic Centimeters ÷ 29.57 = fluid ounces.

Cubic Meters × 35.314 = cubic feet.

Cubic Meters × 1.308 = cubic yards.

Cubic Meters × 264.2 = gallons. (231 cu. in.)

Grams × 15.432 = grains. (Act Congress)

Grams (water) ÷ 28.35 = fluid ounces.

Grams ÷ 28.35 = ounces avoirdupois.

Kilogram Meters × 7.233 = foot pounds.

Kilograms per cubic Meter × .026 = lbs. per cu. ft.

Kilowatts × 1.35 = H. P.

Watts ÷ 746 = H. P.

Watts ÷ 737 = ft. lbs. per sec.

Moisture content = total weight — bone dry weight ÷ total weight.

Regain = total weight — bone dry weight ÷ bone dry weight.

Yards × 8.33 ÷ wt. in grains = hank number.

100 ÷ 12 × grain silver number = hank roving number.

Calculated count — actual count × 100 ÷ calculated count = % contraction.

Staple allowance + $\frac{\text{dia. rolls}}{2}$ = gauge for setting rolls.

Mechanical Draft = Surface speed of delivery roll ÷ surface speed of feed roll.

Draft Constant = Draft × Draft gear.

Wgt. fed ÷ wgt. delivered = resultant draft.

Twist per inch = twist multiplier × square root of hank rov.

Twist per inch = R. P. M. of spindle ÷ surface speed of front roll in inches.

Twist per inch = twist constant ÷ twist gear.

Shrinkage = reed width — cloth width.

Per Cent shrinkage = shrinkage ÷ reed width.

Total dents ÷ width in reed = dents per inch.

Ozs. × 437.5 = grains.

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The BOBBIN & BEAKER

OFFICIAL JOURNAL OF THE CLEMSON TEXTILE SCHOOL

SUBJECT FILE

4:2.

Apr. 43

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for

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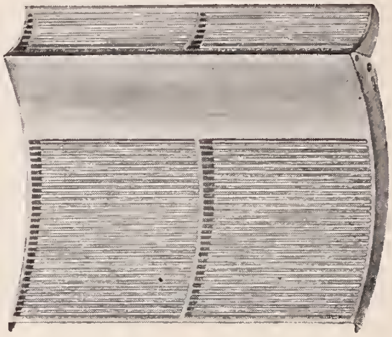

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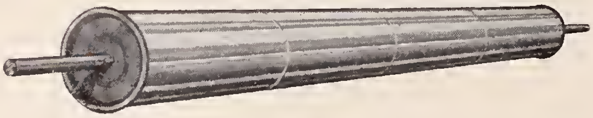

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The Bobbin and Beaker

The Official Journal of the Clemson Textile School

VOLUME IV APRIL 1943 NUMBER 2

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Cover Photo of H. H. WILLIS and R. K. EATON by R. G. HUFFORD

DEDICATION

It is with sincere hopes for the safety of two former students of textiles at Clemson College and members of Iota Chapter of Phi Psi who are now listed as "Missing in Action in North Africa" that we dedicate this issue of THE BOBBIN AND BEAKER.

LT. HERVEY H. ROBINSON
TEXTILE ENGINEERING
CLASS OF 1941

LT. ROBERT L. CHEATHAM
TEXTILE CHEMISTRY
CLASS OF 1942

☆ ☆

Guest Editorial

Planning For Peace

BY W. M. McLAURINE

Secretary and Treasurer, American Cotton Manufacturers Association

There is an old nursery rhyme which reads as follows:

Humpty Dumpty sat on the wall,
Humpty Dumpty had a great fall
All of the King's horses and all of the King's men
Can't put Humpty Dumpty back again.

It is said that most of these rhymes had their motivation in some phase of reality. This one could easily have referred to some glamorous and egocentric politician or public leader who sat on the wall listening to the plaudits of his public so intently that he failed to see the lurking assassin stealthily creeping up behind to strike him down.

To bring the story to the point desired to be stressed, he looked too intently in one direction and failed to look around him so that he would know all conditions.

Today there is a magnet so strong in its pull on our minds and hearts and patriotic devotions that we may sit on the wall and see only one side of life with the result that we may later be knocked off of the wall by some unseen force.

The winning of this war is the most mandatory purpose now pervading the minds of men. All activities and desires are spent in attaining this end and yet life with its eternal purposefulness moves on. There will be a peace some day and the problems of peace must be met with as much boldness and resoluteness and purposeful planning as have the problems of war.

The possibilities and problems of war faced this nation long before the actual necessities arrived and yet this nation only talked and talked and argued and dealt with theories and abstractions; finally the awfulness of unpreparedness faced us and stunned us. The work had to be done with dislocations and expense and delay that were disastrous. We are now getting into our stride but the delay has been a factor in lengthening the war beyond what it might have been if we had been prepared.

W. M. McLAURINE

Humpty Dumpty was too busy with reforms and political experiments and an ignorant belief in his physical isolation to look all around him until the enemy struck its deadly blow. Humpty fell off the wall, but in this case he will be or is back again.

We don't know when the war will end. We believe it will end and that once again the arts and sciences will be invoked in working out a social economy for peace. The greater the action, the greater will be the reaction. No war in history has produced greater action in men and materials. The whole world is topsy-turvy and must finally be brought back to or made to approach some form of political equilibrium.

"Time is running out,"—the end is closer than it once was. The great disturbing force of mankind is economic security. So much of the unusual artificial yet necessary industrial activity will cease or change its motivation when the war ends. What are the industries that will end and how can they be changed into peace time agencies?

Those who continue in their present activities will be influenced by the stoppage of war demands. Who has any idea of how much or what can be done to offset this industrial necessity when it ends. Unemployment was the savage monster that wrecked our economic empire during the last decade.

Science and technology have been exceedingly active in the fields of research. Their findings and plans are silently awaiting an opportunity to sweep out in peace world activities and make themselves manifest.

There will be new machines and new products; new competitions and substitutes, new labor saving gadgets with automatic devices. There will be new industries that will make a place for themselves. There will be a decentralization of industry and likely the South will have its greatest industrial growth in the post-war period. There will be new social, economic and political problems or perhaps it is better to state that these problems will take on new or different meanings.

The pulpit and the pew, the public and the press will be caught up in the confusion of adjustment. The greater the intelligence the less the confusion. I realize that there are no answers to these pro-

(Continued On Page 15)

How About Cork?

BY L. H. HANCE, '44

When Professor William G. Blair began selling covered rolls for the Armstrong Cork Company, the textile industry was not very responsive. At this time the entire industry was going through a period of change in draftng processes. The textile manufacturer wanted a roll that would endure the pressure of long draft, for the leather rolls obviously could not stand up under the strain. The cork roll at this time was not developed to any great extent, and Mr. Blair, as a representative in the Southeast, wanted a cork roll that would take the place of the leather roll and that would endure the long draft.

For many years the cork companies who made stoppers for whisky flasks and druggists bottles, had hunted some means of using the strips of corp from which the stoppers were cut, in an effort to avoid waste. When the idea of using cork covered rolls was presented they saw an easy means of using this surplus cork. They ground the cork and compressed it into a long sheet from which the coverings for the rolls were cut. After years of experimentation the cork rolls still were not perfected. With the introduction of long draft spinning and roving processes the cork companies saw their opportunity. Heretofore in the compression process the cork particles had been pressed together as the scales of a fish. When the roll revolved the projecting particles caught the fibers and caused lap-ups. By changing the direction of compression the cork companies made a roll that did not produce a lap-up and that would endure long drafting processes.

Mr. Blair at the time previous to the boost in the cork industry had tried to get his company to produce a roll that would meet the manufacturers' need. The textile industry was not anxious to change from leather rolls and a long line of custom. Mr. Blair said that in introducing cork rolls to the Southeast he had to overcome the custom of one hundred years.

For nearly four years he endeavored to find a roll, and to present the roll he represented, in order to meet the necessary requirements. As he left the Armstrong Company, the new cork rolls were developed and the cork boom was on! The cork roll and long draft made an excellent combination. The cork roll reduced the hard twist and hard ends that were produced by the leather roll and the long drafting process.

The textile industry was very receptive to cork rolls when the cork companies met their requirements. So many manufacturers liked the new cork rolls that today more than eight million rolls are being used in industry for half of the cotton spindles in America.

"With this sudden popularity of cork rolls," said Mr. Blair, "the leather companies were forced to take steps to prevent their annihilation. They developed their own rolls, selecting better leather and gave it a better processing. The result today is that the leather companies are presenting a better roll for better production to meet the competition of the cork roll."

When we interviewed Mr. Blair in his office on the third floor of the Textile Building, he seemed still optimistic about the future of cork covered rolls. Mr. Blair has been a member of the Clemson faculty for a long time. He came to Clemson after graduating from the New Bedford Textile School. After many years he accepted a job with the Government testing department, and from there he went to the Armstrong Cork Company. He has been assistant professor of Carding and Spinning since he left the Armstrong people. Mr. Blair is credited with presenting the cork roll to the textile industry in the Southeast.

Today the cork industry is finding it somewhat of a problem to meet orders because of the lack of cork and the destruction of many of its sources. Some companies have developed new means of treating the cork from a tree that is only ten years old. In the past it was necessary that the bark of the cork tree be almost twenty years old before it could be used for making rolls. Many people believe that the rapidly developing synthetic covered rolls will possibly make some advances under the present circumstances. The makers of synthetic coverings have been forced to perfect their own rolls also, in meeting the competition brought about by cork rolls.

As to the future of covered rolls, Mr. Blair says, "the changing textile industry will probably bring a still greater change in roll coverings. New devices will bring about new necessities and requirements. There is a great possibilty that a plastic roll or a combination of plastic and cork, or some other material yet to be discovered, may prove to be even better than our present rolls."

SOVIETS RAISE BLACK COTTON

Black cotton is a new variety recently originated by Russian plant geneticists. One advantage which this cotton has, together with other varieties with colored lints ranging from red to green, is the eliminating of the dyeing process. It is believed that the natural black will be a faster color than the black of dyed cottons.

American cottons with green and brown lints have been known for some time, but are not grown on a large scale because their yield is considerably lower than the white linted varieties. Our colored cottons are used principally in certain regional handcrafts industries.

—Science News Letter—
Jan. 30, 1943.

Renaissance In Research

BY J. J. McCARTHY '43

At last the textile industry has awakened from its slumber! Research is on the move after many years of inactivity. It may be said that this new movement is many years behind time, and that is true, but now we are witnessing action which will bring results to an industry which has, may we say, long neglected itself. Heretofore, research has been associated with such activities as medicine, metals, minerals, chemistry, the automotive industry and others. It appears that the textile industry could find no use for such a thing as research. Perhaps it was because the art of textile manufacturing is so very old that the conventional methods and processes became too firmly embedded in the minds of the men in this industry. It may also have been because the supply of raw materials which are used has never been seriously imperiled. Cotton has always been produced in the same localities and it was never thought that there might be a time when we might have to use different fibers other than cotton and wool. Our chemists began to develop fibers from cellulose, the very thing which is a large constituent of cotton itself! This was the beginning of some serious competition to 'king cotton'. Continuing their work, the chemists brought about a fiber very similar to wool—composed mainly of protein as is wool itself. This was further competition in progress against our natural fibers. These activities have continued until the present time, and are still in progress. As a result, it is not at all difficult to see what a great place the chemically-created fibers have taken in our textile world. It certainly is high time for 'king cotton' to be on the move if he expects to keep up with this fast-moving "synthetic age."

Things are beginning to stir a little and some progress in research is beginning to show in spite of war-time conditions. Even before Pearl Harbor we began to mobilize our forces as the crisis was approaching. We know that textiles are just as important to the war effort as are minerals and metals. This industry's job is to clothe and supply not only the Armed Forces of our Nation but all of our allies. It is now necessary not only to fight for the welfare of the industry itself, but to gear the industry for contributing to the salvation of this great Nation of ours.

The textile industry has done a marvelous job in fulfilling its part of the war effort, as we all know today and it will continue to do so for the duration. However, the job does not end with the peace treaty. Rather, it only begins there. We are not living our whole lives for the prosecution of a war. The war is only a hideous interlude in the progress of a nation at peace. True, it is a job which demands the very utmost attention and effort at present, but it will not last forever. This great United States of America has been made great through the works of her people in a time of peace. It is because of her peacetime development that she is able to meet the almost impossible tasks of war.

Consequently, we must see that it is the future that we have to look to. We certainly can not do anything with the past, it is gone! For the present, we can only use benefits which were afforded us by men in the past. But for the future, the benefits and progress are limited for us only by ourselves, and the happiness of those to come after us depends to a great extent on what we do about it right now. We have heard students here in our textile school at Clemson say, "Oh, what's the use of studying; what's the good in going on?" As Mr. Wigington of the Cotton-Textile Institute says, we may not be here, but the textile school will be here, and the industry will be here.

What would become of our future citizens if we all took such an attitude? Our point boils down to this—research is going to be a great contributing factor in the future welfare of the textile industry, and the sooner we realize this, and the sooner we get busy at it, the better off we will be in our textile world.

The New Orleans Laboratory

Without exception one of the most notable examples of this new and emphatic research program is the New Orleans Laboratory. Its full name is The Southern Regional Research Laboratory of the Depart- of Agriculture. The building is 211 feet wide in the main section and the two wings are each 368 feet along the sides. It represents an investment of well over $1,463,000. Construction was started in June 1939, and today the whole plant is in full operation. We bring you here parts of the report by the Director of the Laboratory, Dr. D. F. J. Lynch, presented at the annual meeting of the Cotton-Textile Institute last October.

"In assigning commodities to the four regional research laboratories the Department of Agriculture allotted to the Southern Laboratory cotton, sweet potatoes, and peanuts. About 80 per cent of our research effort is directed toward the utilization of cotton and cotton products. For the administration of the research program, our work is divided among seven research divisions. We have one division which works only on sweet pototo products, an Analytical, Physical Chemical, and Physical Division which carries on all of our analytical and special physical work; an Engineering and Development Division for carrying new products and processes beyond the laboratory stage; an Oil and Protein Division which concentrates on cottonseed and peanut products; and three divisions which work on cot-

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Zoot Suits--Out Of This World!

BY H. R. VALERIUS, '45

"Out of this world," was a favorite cry of the jitterbugs in zoot suits, but now the government has taken up the cry. The rug-cutters are slated for a little scissor session with Uncle Sam. The cloth in our clothes has to be cut to a minimum. It is easy to see how serious the situation is when cuffs have to be taken off pants, and this action affords a great saving in cloth. It is a waste of cloth and unpatriotic during war-time to produce the full-cut "zoot suit" when it is so necessary to save as much as possible in order to meet the demands of our armed forces, our allies, and essential civilian needs.

The zoot suit might just have been a fad and died out in a year or two, or it might have made a definite impression on the styles of our clothes. It did start to creep into fashion, but the war put an end to it. Textile mills are being converted to an all-out war effort and workers are staying on the job many hours overtime. It is only right that the "zoot suit" advocates go back to pleatless, tuckless, and cuffless clothes for the duration. We must do away with all excess consumption.

The zoot-suit was originated by Al Capp in his comic strip "Lil Abner." Capp did not attempt to create a different style, but he used the excess amount of cloth in the clothing of his minor characters for contrast. It started nearly five years ago when "Lil Abner," a hillbilly, first visited the big city. "Lil Abner's" suit was too small, the sleeves were short, the pants were short and tight, and all the seams were stretched. Upon reaching the city he saw clothes that were cut full and roomy—to him that was a sign of wealth. The city characters had hats with huge brims and coats that were extra long, with padded shoulders, and very full sleeves. The pants were baggy, but they fit well at the bottom. In general "Lil Abner" saw everyone wearing clothes that were spacious.

The costume was widely adopted by millions of jitterbugs, and it grew so popular that the Washington and Willard Hotels had dances for zoot-suiters only. The place was packed and jammed. News photographers were in their seventh heaven. The coats are knee-length, with padded shoulders, very full sleeves, and a tight waist. They are worn mostly in plain colors. The trousers have a lot of pleats, and the top of the trousers usually comes up to the arm-pits. They are loose and baggy at the knees, but are so snug around the ankles that zippers have to be used so that the foot can get through. The zoot-suit is worn with striped shirts, with long-tab collars, shoe-string ties, and suspenders that have the ends hanging down the front. A key chain is usually worn, which drapes down to the knee, or below, and back up to the pocket. Square-toed shoes with very thick soles and plaid shoe strings go with the ensemble. To complete the effect a hat with a very small crown and exceedingly large brim is worn which is usually loose enough to touch the ears.

The loss of long coats, baggy knees and chest-high trousers are gone today, but perhaps some day the famous zoot-suit will return.

A Statement By F. S. Blanchard

President, Textile Research Institute

I firmly believe that there never was a time in the textile industry when research has been more important than it is today. We need research and we need it badly to win the war and we need it also if our industry is to win the peace.

New fibers, natural and synthetic, with new ways of treating these fibers—aided by the great achievements of chemistry—are coming rapidly to the forefront. If cotton is going to hold its own in the great competition ahead, it needs to call scientific research to its aid in showing us how to improve it and its performance, perhaps chemically, to modify its qualities, so that it will meet the needs of the war and survive the competition of the peace.

Not only is scientific research needed on the fundamental qualities and structures of the fiber, but we need so-called practical research on what is happening to the fiber during the different processes of manufacture. Some time ago at least one mill with which I was familiar learned a good deal about how to improve the running of the work by processing studies using the aid of photomicrography. On the basis of these studies standards of operation were set which in turn made possible much improved standards of end breakage, loom stoppage, etc. On these standards, in turn, jobs were set up which resulted in great improvements in labor efficiency without increased effort on the part of labor.

It is not unreasonable to believe that similar studies today, if undertaken under the supervision of experienced research men, aided by practical mill executives, would help many mills considerably—even on staple goods—in improving the running of their work. And this is especially important today, when a threatened shortage of labor faces many plants in the industry.

There Will Always Be A Textile Industry

BY PERRIN N. COLLIER,

Vice-President and Director of Research,
Callaway Mills

There will always be a textile industry. The art of weaving was developed early in the history of civilized man. The industrial revolution centered around the textile industry when spinning jennies and power looms displaced the hand work of countless individuals. In the present struggle the textile industry is recognized as being essential to the war effort; with the return of peace it is certain that textiles will be continuously in demand.

Yes, there will always be a textile industry. This to some may mean that there will always be a COTTON-textile industry. But let me point out a number of instances where a well-established industry has been completely revolutionized. Take the indigo industry. Indigo was at one time collected from plants by thousands of underpaid laborers and in small yield until the Chemist Baeyer, in 1882, synthesized the compound in his laboratory, using coal tar as the source of this material. In the year 1935, as a result of his discovery, over 7,000 tons of synthetic indigo were used in the United States alone. A more recent example is the case of silk which was produced from the cocoon using Japanese laborers whose average wage was a few cents a day. The yield was small and the ultimate cost of the product was high. Now, the synthetic, Nylon, quite adequately fulfills the uses of silk, and natives formerly dependent on the silkworm for a livelihood may as well look for a new occupation. This is true of the rubber industry which will never go back to complete dependence on nature and low-priced labor for its raw material. The emergency has forced us to build synthetics and the natural rubber will have to compete as to price and quality when production is established and peace finally comes, for the course of mass production has always been toward a better product at a constantly decreasing price.

PERRIN N. COLLIER

These examples should be sufficient warning that it CAN happen here and that any fiber, whether it be cotton or some other, that is to be used in the textile industry must meet the requirements of physical properties and cost. Cotton is no longer king. Cotton can no longer depend upon its ancient and romantic history for prestige; *it must stand on its merits alone.*

The Significance of Rayon

Before the year 1920, the American textile industry employed only the natural fibers—cotton primarily, then wool, silk, linen, hemp, and jute. Excluding from consideration hemp and jute, cotton consumption in 1938 was 81% of the total poundage, rayon was 9%, wool 8%, with silk amounting to only 1.5% of the total. This lusty newcomer rayon, only recently having attained its majority in the American textile industry, ranks second in the field of total poundage, and its significance is greater than these figures indicate. It has entered the dress goods industry; it dominates the underwear industry; it is being used extensively for hosiery, for sportswear, and even for mechanical fabrics. It affords interesting decorative effects for incorporation into drapery and upholstering. Originally designed as a cheap substitute for silk, its versatility, usefulness, and eventual cheapness has led to competition with cotton in numerous fields, especially since the development of staple fiber.

Adequate production figures are not available on Nylon. It is used in place of silk in parachutes, has achieved a conspicuous success in hosiery, and its ultimate utility appears to be limitless. This product of the test tube in certain characteristics has improved on nature.

Vinyon and its close relative, Saran, are additional contributions of high-polymer chemistry to the textile field. Fabrics from these materials are decorative, waterproof, and resistant to acid and alkali. They are used in insulating materials, in filter fabrics, and in upholstering. When the coming peace releases from strategic war needs the polyvinyl polymers from which these fibers are made it is certain that a marked expansion in volume of such fibers will take place.

The proteinoid fibers such as those derived from milk, soybeans, and peanuts were originally developed as a substitute for wool. They are now being used as diluents for wool in blends, but the technology of these fibers has not been sufficiently advanced so that they may be considered as wool replacements.

New Glass Fiber

The relatively recent development of a fiber from glass has afforded an excellent material for electrical insulation and for fire-proof fabrics, and further progress is being made.

There is a principle in the foregoing examples that will vitally affect the future of the cotton business: The growth of the synthetic fiber industry is the result of a real need—fibers having definite desirable properties have been produced for a given purpose. Further, the synthetic manufacturing process may be altered to produce a fiber which emphasizes a single given property, thus making the fiber "tailor-made" for a specific purpose. For example, the diameter of the synthetic fiber may be made fine or coarse as the needs demand. It can be made in continuous lengths or stapled to any desired length, it can be made with or without luster, it can be made to have a round cross section or a serrated cross section; it can be made of normal strength or by stretch spinning to have a higher tensile; it can be made with crimp or without crimp. Truly then it can be said to be a "made to order" fiber. The continually improved position of the synthetic fiber industry is the direct result of progress made in the preparation of a uniform fiber and in fabrication from the fiber, and this progress has been accomplished through *unceasing research.*

Let us be specific: the first rayon manufactured had poor physical properties and had to undergo much technological development before it attained its present favorable characteristics. The first field that rayon entered extensively was dress goods, where its smoothness and soft hand were very desirable properties, and where it was a popular novelty. From this as a beginning, the rayon technologist developed a fiber that was not only silk-like in appearance, but had increased strength and therefore could be used in other fields. Having done well in these first fields of style and apparel, the rayon manufacturers have cast more than covetous glances at the extensive mechanical and industrial markets for textiles, of which the tire cord trade is an outstanding and currently notable example. Whether by design or accident, they appear to have surveyed the most extensive and lucrative markets possessed by cotton manufacturers and by diligent research to have developed a fiber that would be most suitable for those markets.

Analyze's Cotton Fiber

Let there be no misunderstanding: these statements imply no resentment against the synthetic fibers—they have earned their present place by right of conquest and have been a real contribution to society. The synthetic fiber industry is here and here to stay because it fulfills a definite need and does it well.

Now that we have noted the development and growth of synthetic fibers, let us consider the cotton fiber. Cotton possesses certain inherent advantages over other fibers, synthetic or natural, which account for its present predominance in the textile field. It occurs naturally in a fiber form, whereas the synthetic material must be fabricated into fibers. It occurs as a rather pure form of cellulose, while the cellulose in wood, which is the largest source used in rayon manufacture, occurs along with lignin, a very troublesome substance. Cotton's relative purity affords great stability—it is relatively insensitive to ordinary degradative influences. It is independent of temperature effects, being flexible at low temperatures and remaining so at high temperatures without becoming plastic or fluid. The great tensile strength of the fiber is well-known; the wet strength of the yarns and fabrics made from cotton may be envied by most other fibers. The cotton fiber itself possesses the flat, ribbon-like structure of a collapsed cylinder, with convolutions along the surface, which naturally enhance its spinning qualities. Cotton has highly favorable flexing properties and fabrics made with this fiber offer good resistance to abrasion.

Why do I mention all these desirable properties of the cotton fiber? Simply to show that the cotton textile industry has had a superior raw product with which to work all along, that the present position of the industry is due almost entirely to this fact alone, and, most important of all, that these outstanding attributes make a splendid starting point for research work.

Industry Too Lethargic

Let me add immediately that the cotton industry as a whole has assumed a lethargic attitude and has paid little attention to improvement in the cotton fiber itself so that it might meet the demands of the trade and the competition of the synthetic fibers.

Cotton has been in a favorable economic position with respect to synthetic fibers. This in part is due to the fact that the cost of producing the two types of fibers has not heretofore approached comparison. Fortunately, the seed of the cotton fiber is a by-product, which is a rich source of oil and nitrogenous material. The linters from around the seed compose the raw material for cellulose acetate and for nitro-cellulose which is used in lacquers and guncotton. These well-developed by-products account in part for the low cost of the raw material, and should help the fiber remain in a competitive position with the newer fibers.

Of course, the cotton textile industry had rather continue using cotton—tradition, sentiment, and experience all make us favor cotton. But we must face the fact that if the synthetic industry furnishes us with a fiber which more adequately fulfills a given need, we can rather easily convert our productive equipment to handle this raw material. For example, most cotton mills can process staple rayon with few, if any, changes. It is therefore incumbent upon the entire cotton industry, from the breeders on through the sales organizations, to face this situation. If serious economic losses and social dislocations are to be avoided, a sustained program of cooperation and research will have to be accomplished.

The program of action must be

Callaway Research Building

comprehensive, extending from the cotton field right up to the ultimate consumer of the goods.

In the first place, research on breeding should be continued and the results of this research should be applied extensively through cooperative agencies.

Improve Raw Material

Second, the raw material as it comes to the mill can very definitely be improved by better handling from the field through the cotton gin. This can be accomplished only by the concerted efforts of research-minded men, through the use of scientific methods, and by the correlated efforts of the various groups now established to safeguard the cotton industry as well as the cotton textile industry.

In the third place, each manufacturing process should be the object of continued study and possible improvement. The textile machinery manufacturers should cooperate with the mills in developing machinery which will give a more uniform product faster and with greater efficiency.

Fourth, economic research should be conducted and an even more vigorous publicity campaign be launched. From the economic research should come information about possible new markets, and the advertising should be used so as to reach these markets effectively.

Fifth, and most neglected, is the study of the physics and chemistry of the fiber. This work must be greatly extended since it is only through such an approach that the cotton fiber may be tailored to a specific need. Much fundamental work must yet be done on the constitution and properties of this raw material. For example, if we could improve the extensibility or elasticity of cotton, this audience is well-aware of what far-reaching results would come from such a discovery. Without a doubt improvements can be made in such features as crease resistance, flex life, resistance to abrasion, draping quality of the fabrics, hand or feel, and appearance of certain fabrics. Cotton can be made to replace linen and certain of the best fibers and enter fields where it has never been heretofore.

Agencies at Work

There are a number of agencies at work at present in such studies. They are doing splendid work on relatively small appropriations and are nominally cooperating at this time. It is to be hoped that this cooperation may be accelerated. It is certain and recognized that much duplication of effort now exists. This is most unfortunate since there is vastly more work to be done than our under-staffed laboratories can possibly do to assure the future of cotton.

What has been discussed here is not new to you gentlemen. As a matter of fact, much of the program outlined is already organized but not working as effectively as possible. Too many of us have been content to say, "Yes, something is

Scene in Callaway Research Building

going to have to be done,"—and then, like Margaret Mitchell's immortal Scarlet O'Hara, we add: "Oh, I'll think about it tomorrow." And while we have been putting it off, many opportunities have been lost, and the competition has been active. Only last week the War Production Board designated rayon for tire cord for the Army and Navy contracts. It is happening to us right now. Competition, like death and taxes, is always with us, and the sooner we are able to swap blow for blow, the better off the whole cotton industry will be.

There is an appreciable time lag between beginning a research program and producing useful results. Most any worth-while research program we set up will call for painstaking, scientific investigation, and this of necessity takes time. It is obvious that the answers to our questions or the desired results will not be easily found, for products or processes easily found have long since become commonplace. Pursuing a research problem is not like putting up a building. You can't follow a set of blueprints. Although your objective is kept before you all the time, you must travel up many avenues and approaches, only to find a number of them have dead ends. Many interesting things of possible value are encountered all along the way however. Yes, research of necessity takes time, but when a well-defined program is diligently followed there can be no doubt as to the future of the industry pursuing such a program. If cotton is to have a future, the time to begin is yesterday.

"Cottonleather"--A Fabric Substitute For Leather

BY. T. A. TURNER, JR., '44

It is a known fact that during and immediately following a period of warfare the ingenuity of people the world over is unleashed and is thrown on the world for the approval of the people. One of the more recent examples of American ingenuity has just been announced, and promises to bring about a decided change to our everyday living.

This new discovery is particularly interesting to men in the textile and shoe manufacturing business. It is also of great importance to the farmers of this Nation who are devoting their lives to the growing of cotton. With its entire present output already sold to national shoe manufacturers and negotiations under way for the licensing of other factories to manufacture its patented "Cottonleather," a fabric substitute for leather, the Southern Friction Materials Company of Charlotte, North Carolina, is being deluged with inquiries by shoe manufacturers hopeful of finding a successful substitute for leather now that leather shoes are rationed.

Mr. John O. Camp, sales manager of the company, very recently announced that manufacturers in every section of the country were telegraphing and telephoning for complete information about "Cottonleather." The company has orders many times the present capacity of the plant to produce. Mr. Camp estimated that there is a potential present market for fifty million pairs of "Cottonleather" shoes.

Leading authorities of shoe manufacturers who have been experimenting with "Cottonleather" have expressed their opinion that it is the best substitute for leather shoe soles yet developed. One major shoe company in the South which has made comprehensive tests of the material claims that "Cottonleather" outwears present shoe sole leather. One of the largest manufacturers of shoe machinery who recently completed tests of the fabric say that it is adaptable to the various shoe manufacturing processes with the use of existing shoe machinery. This is a big factor now that it may be virtually impossible to procure priorities for materials with which to convert present shoe manufacturing machinery.

Shoes may be manufactured from "Cottonleather" as soles and other fabrics, particularly cotton, without the use of leather and such shoes are not rationed. The material, the basis of which is cotton chemically treated, is manufactured in two, three, four, and five ply thicknesses. It may be used for both men's and women's shoes of various types and styles, particularly sports shoes and work shoes. The company is now working on a fabric for shoe uppers.

This fabric was developed primarily for the manufacture of brake linings, but at once many other uses were seen for the fabric. Since the recent order for the rationing of shoes throughout the Nation interest in the fabric increased to such an extent that the company was bombarded with inquiries, some from foreign sources.

It was seen at once that the use of the fabric on a widespread scale

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Textile Lighting

BY CHARLES R. CUTTLE, '43

Today there is in general use two types of industrial lighting, namely, incandescent lighting and fluorescent lighting. All bulbs which screw into sockets, and which have been used extensively in most mills up until recently, are the incandescent type lamps. Today, however, the trend in industrial lighting is toward the fluorescent type lamp. Most of us are familiar with the fluorescent lamp. The lamp itself is a tube which ranges in size from nine inches in length and five- eighths inches in diameter, for the six-watt lamp to sixty inches in length and two and one-quarter inches in diameter for the hundred-watt lamp. In most practical applications it gives off a day-light blue, although it can be obtained in a number of other colors and in white. We are attempting to describe the fluorescent type of lighting here for the benefit of those who do not know much about it—as it is a comparatively new thing.

There are many advantages to fluorescent lighting, the greatest being high light out-put per watt of power used as compared to a low light out-put per watt of power in the incandescent lamp. The incandescent lamp gives off light from a filament which is caused to glow by an electric current passing through it. Only 10 per cent of the electrical power or electrical energy used is converted into light; the other 90 per cent goes into heat and is given off. The fluorescent lamp operates under an entirely different principle. The lamp is lined with a white phosphor fluorescent powder (a different powder for each color—for daylight lamps the powder is Magnesium Tungstate). In the lamp, or tube, there are two small filaments or electrodes, one at each end. The filaments do not give off any light to speak of. An arc jumps back and forth from one filament to the other many times a second. The radiation from this arc, or flow of electrons, strikes the phosphor fluorescent powder and causes a radiation of a different wave length. This radiation is the light which is given off by the fluorescent lamp. Thus, the light given off is not from any electrical source directly, but comes from the phosphor fluorescent powder which is caused to give off light by the action of the electric arc.

The fluorescent lamp is much cooler than the incandescent lamp because of the small amount of power or energy the two small filaments of the fluorescent lamp use.

The advantages of fluorescent lighting in textile mills are many. A room lighted by fluorescent lamps has a very uniform light that is well diffused. The 40 watt fluorescent lamp will light 225 square inches as compared to 20 square inches which the incandescent lamp will light.

In the weave room a uniform light of high intensity which is practically the same as daylight can be obtained at a much lower cost than that of the incandescent lamp. In a mill weaving fine or colored goods fluorescent lighting is especially important. In every cloth room fluorescent lighting is very important in conjunction with cloth inspection. Not only in the weave room and cloth room is it important, but all over the mill. Fluorescent lighting is better for the worker's eyes, which in turn improves his working conditions. Improved working conditions in the mill will aid in increasing producton and raising the quality of the goods. In very modern mills where there are not any windows, and in air-conditioned plants lighting can be kept uniform twenty-four hours a day. In the finishing and dyeing plant fluorescent lighting is important where shades are being matched. Knitting mills need this new type of lighting because the parts in a knitting machine are small, and also because the knitted fabrics must undergo the same inspections as in the weaving mill.

The 100-watt unit is suitable for use in mills. It weighs about 25 lbs. The unit contains two 40-watt tubes which are 48 in. by 1½ in., and an auxiliary (necessary to supply correct tube voltage). The tubes are mounted in a simple white porcelain reflector which measures about 55 in. by 10 in. with the auxiliary mounted on top of the reflector. The unit should be suspended from the ceiling by two chains. A spring attached to each chain is recommended in order to cut down the vibration which is especially bad in the weave room.

In the weave room one 100-watt unit to every 64 sq. ft. of floor area should be suspended perpendicular to the harness, 9 ft. above the floor. For Slubbing, Roving, Spinning, Spooling, Warping, Beaming, Slashing and Knitting, the unit should be suspended 11 ft. above the floor, one to every 100 sq. ft. of floor area. For Opening, Mixing, Picking, Carding and Drawing, the unit should be suspended 13 ft. above the floor, one to every 144 sq. ft. of floor area. For the cloth room, Inspection room, and Drawing-in by hand, the unit should be about 7 ft. above the work, one unit to every 36 sq. ft. of floor space. These recommendations are only approximate, and may be adopted when using the daylight-type lamps in the unit. In addition, it is recommended that the walls be painted as light a shade as practical.

Fluorescent units have power factors just as electric motors do. The power factor of a fluorescent unit should be .95 or above. If the power factor is not corrected to .95 or above, the power company will be reluctant to allowing the mill to use the fluorescent unit, or will charge the manufacturer more per kilowatt hour as read from the meter. The volt-amperes necessary

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The Editor Says—

DEAN WILLIS RESIGNS

It was with deep regret that we, the textile students of Clemson College, heard the announcement on February 2 that our Dean and friend, Mr. H. H. Willis, had handed his resignation, to become effective February 6, to Dr. Poole, President of the College.

During the time that we have been at Clemson we have seen the Textile School grow in size and we have seen its reputation as a Textile School improve greatly under the competent leadership of Mr. Willis Before the beginning of the present war we saw all the graduates of the school secure positions of importance in the industry and we saw a much greater demand for graduates than the school could supply.

Many times we have talked over our problems with Mr. Willis in his office and he has never failed to give us his attention and support. He was greatly interested in improving the school in any way he could, especially through the work of the students after they left the school. On more than one occasion he has shown his extreme interest in our publication, THE BOBBIN AND BEAKER, and has done all in his power to help put the publication over to the public. He has constantly been on the alert to maintain and improve the reputation of Iota Chapter of Phi Psi, located at the Clemson Textile School.

Mr. Willis, while serving the Textile School as Dean, has made an untold number of friends for himself and for the school; he has built a school of which we are justly proud.

While he carries on his new work in the industry, Mr. Willis plans to make his home on the Clemson Campus. It is our sincere hope that he will not become lost to the school but will maintain close relation with us, the students, and with our predecessors in the industry.

M. D. M.

R. K. EATON NAMED ACTING DEAN

Mr. R. K. Eaton has been named acting Dean of the Clemson Textile School to fill the vacancy created by the resignation of Mr. Willis. Mr. Eaton has been with the school as instructor for a period of years and has grown to be admired by everyone who, in any way, is related to the school. "Pop", as he is called by those who know him intimately, has been an outstanding leader in the school since he first joined the staff and he is recognized by leaders in the industry as an authority on mill economics, textile management, and textile processing.

We are glad to see one so interested in the school become our Dean. We know that he will be faced with many serious problems now and in the future as the war continues. His first problem, one of vital importance, is a shortage of teachers in the school. This has been caused by so many of our teachers being called into the armed forces of the nation at a time when they cannot easily be replaced. However, we feel that the staff now at the school will cooperate to the fullest extent possible to overcome this problem so that Mr. Eaton may lend his efforts to other situations as they arise and maintain the reputation that the school has obtained.

We feel sure that Dr. Poole, in making the appointment to the position of acting Dean of the school, could have made no better choice and it is our hope that one so interested in the school as Mr. Eaton will be given the position when it is filled, not temporarily, but permanently.

M. D. M.

OUR GRADS NOW SERVE

Approximately five hundred graduates and former students of the Clemson Textile School are now serving in the Armed Forces of our Nation. They came to Clemson from many walks of life but they all left with one point in mind, never to commit an act or deed that would discredit their Alma Mater in any way. They returned to many walks of life but that one point has still remained foremost in their minds and today they are proving their worth on the fields of combat throughout this war-torn world. If they die, they will know that they have not died in vain; if they live, they will return to see the results of their sacrifices.

We at home, away from the bleak and desolate battlefields on which our boys are fighting, cannot express in words our thanks for the way in which they are serving to make the world safe for Liberty and Democracy.

With reference to those sons of Clemson who have made the supreme sacrifice, we can only say with the poet,

"There is no holier spot of ground
Than that on which defeated valor lies."

M. D. M.

WE ARE GRATEFUL

This is the last issue of THE BOBBIN AND BEAKER to be published by the present staff and it is our sincere hope that we have at least partially accomplished our purpose in publishing the magazine. It is now that we wish to take time out to express our appreciation to those who have made the publication of the magazine possible.

First, we appreciate the cooperation of Mr. H. H.

Willis, Mr. R. K. Eaton, and Mr. J. C. Littlejohn and his staff for their valuable advice and aid. We appreciate the guest editorial by Mr. W. M. McLaurine, Secretary and Treasurer of the American Cotton Manufacturer's Association. We are grateful to Mr. John T. Wigington, Director of The Cotton Textile Institute, for his articles and his wonderful display of interest in our publication. We also wish to thank Mr. Perrin N. Collier and Mr. F. S. Blanchard for allowing us to reprint their articles in this issue.

Thanks, too, to the Clemson Textile Students who have done the actual work on the magazine.

And last but not least, we wish to thank our advertisers for making the publication of the magazine possible. We hope that our services have proved and will continue to prove as valuable to you as yours have to us.

M. D. M.

UNTIL VICTORY IS OURS

It is with much regret that we must announce the possible suspension of publication of THE BOBBIN AND BEAKER for the duration of the present war. Under such conditions as exist now the publishing of the magazine has become increasingly more difficult and the continuance of such conditions will soon make publishing an impossibility. However, after victory is ours and existing conditions improve, THE BOBBIN AND BEAKER will return to its friends in the school and in the industry.

For four years since the organization of THE BOBBIN AND BEAKER by Iota Chapter of Phi Psi the magazine has been published by the students of textiles at Clemson College. During this time the magazine has gained the recognition and confidence of the industry; advertisers have realized that it is a sure way of getting their messages to the industry. The free mailing list of the publication has grown to include every textile mill in North Carolina, South Carolina, Georgia, and Alabama. The magazine has received much favorable publicity in such trade journals as The Textile Colorist and The American Wool And Cotton Reporter and in trade papers as The Daily News Record.

A staff has been named to publish the magazine next year if publishing is possible. It is our sincere hope that we may continue to keep, without interruption, our contact and increasing friendly relations with former students of textiles at Clemson and with the entire textile industry.

M. D. M.

Phi Psi Inducts Seven New Members

Photo by R. G. Hufford

Above are the seven men recently inducted into Iota Chapter of Phi Psi, national honorary textile fraternity. They are, from left to right, front row, C. J. Taylor, F. C. Rogers, and Leon Tigler. The men in the back row are Professor W. B. Williams, T. A. Turner, E. T. McIlwain, and J. B. Rhame.

Willis Resigns As Dean--Eaton Takes Over

BY M. D. MOORE, '43

H. H. WILLIS

On February 2, Mr. H. H. Willis made public the announcement that he was resigning his position as Dean of the Clemson Textile School. Since Mr. Willis first began to serve the school in this capacity the school has grown from an enrollment of 70 sutdents and 4 teachers to 350 students and 15 teachers prior to the present war. In resigning this position, Mr. Willis brought to an end his direct leadership of the school which he has very capably handled since 1927 when he was appointed to the position.

Mr. Willis was reared in the mill town of Clifton, South Carolina. He had approximately nine years of practical experience in general textile work with the Clifton Manufacturing Company at intervals prior to 1917. Shortly after graduation from Clemson in 1917 he enlisted in the army for the duration of the war. He served as a private and sergeant at Fort Screven, Georgia, and in September, 1918, was commissioned a Second Lieutenant and sent to Edgewood Arsenal, Maryland, as property officer. He was later transferred to Camp Upton, New York, as paying officer during demobilization. He was honorably discharged in September, 1919, having served some twenty-six months.

After this service, Mr. Willis held a position with a bank in Spartanburg for a short time, resigning to accept an instructorship in the Clemson Textile School. He resigned this work in September, 1920, to accept a position as Assistant State Supervisor of Industrial Education in North Carolina. In 1921 he resigned this position to accept a position as Cotton Specialist with the U. S. Department of Agriculture, Bureau of Plant Industry.

He was connected with the U. S. Department of Agriculture from 1921 to 1930. During the first three years of his work with the Department of Agriculture, he spent considerable time in the Southwest (Texas, Arizona, and New Mexico) in selecting certain varieties of cotton for spinning tests. Many of these varieties were tested at Clemson and in mills in the East. He made two surveys in Eastern mills with reference to the utilization of certain of these varieties of cotton.

In 1927 Mr. Willis was made Dean of the Textile School at Clemson in addition to his duties as Cotton Specialist, in charge of the cooperative cotton spinning research work. He continued to act in these two capacities until July, 1930, at which time he resigned his government connection in order to devote full time to the Clemson Textile School.

Dean Willis is the author of some fourteen government bulletins. While on this spinning work he prepared some forty reports of spinning tests mainly for the information of the Cotton Division of the U. S. Department of Agriculture. He is also the author of some eighteen articles which have appeared in various textile magazines. He is the co-author of some seven books dealing with cotton yarn manufacturing. These books were prepared in cooperation with the Textile Foundation, Washington, D. C. On this work he was assisted by R. K. Eaton, Gaston Gage, W. G. Blair, and G. H. Dunlap, members of the faculty of the school, and Miss Vernette B. Moore, specialist in Educational Methods. These textbooks are now being used in textile schools as well as in textile plants which are conducting classes in textiles.

From 1927 to 1938 approximately, with the cooperation of the staff, Mr. Willis secured for the school, through donations, over $40,000 worth of equipment and supplies.

For several years Dean Willis and Dr. Sikes, deceased, did much work in South Carolina in acquainting the people and the Legislature with the need for an adequate textile building. As a result a $475,000 building was erected in 1938. During 1939 Dr. Sikes and Dean Willis discussed with cotton manufacturers of South Carolina a plan for raising additional money to buy equipment for the new textile building. A committee, consisting of J. E. Sirrine, J. B. Harris and R. H. Chapman was formed. This committe during 1940 and 1941 raised approximately $45,000 from manufacturers interested in the Clemson Textile School. The outbreak of war and priorities have postponed temporarily the purchase of this new equipment.

On May 26, 1942, Dean Willis presented a plan for the establishment of a textile training foundation. Six objectives were outlined, including the promotion of textile training in schools and colleges, the promotion of further training for skilled workers within the mill, the establishment of better relations between workers and management, and the provision of a competent consultative service prepared to give specific aid on technical and human relations problems.

Dean Willis served the Federal Government as chairman of the Cotton-Textile Industrial Relations Board for South Carolina under the NRA dealing with technical and human relation problems in the textile industry. During the past two years he has served as arbiter and advisor on many such problems, in some cases called by the Federal Government, in other cases by the mill management, by the union, or by management and union jointly.

He now plans to devote part of his time to a textile training program in South Carolina which offers guidance and assistance to young men in the textile industry in getting additional training in textiles. He will devote some time to co-operative work in labor relations and technical work. Mr. Willis will continue to make his home on the Clemson Campus while he carries on his new work.

R. K. Eaton

Immediately after the announcement by Mr. H. H. Willis that he was resigning his position as Dean of the Clemson Textile School came the announcement by Dr. R. F. Poole, President of Clemson College, that Mr. R. K. Eaton had been named Acting Dean of the School until such a time as an appointment to the position could be made. Mr. Eaton, in taking over the school, realizes that he will be faced with many problems brought about by the present war but he is prepared to give his undivided attention to the solution of these problems.

Mr. Eaton was born and reared in the town of Taftville, Connecticut, in 1883. When asked why he decided to enter the textile industry he simply states that he was born and brought up in the industry, having started going to a mill to see his father at the early age of five. Mr. Eaton attended and was graduated from Bowdoin College and later did graduate work at the Philadelphia Textile School in Textile Chemistry and Textile Designing.

His first connection with the industry was with the Whitin Machine Works, serving them for a period of four years from 1907 to 1911. For the first three years of this period Mr. Eaton was employed in erecting cards and spinning frames, and during his last year with this firm he was associated with the Whitin Experimental Waste Plant, Ashburnham, Massachusetts.

Desiring to enter another field, Mr. Eaton accepted a position as Assistant to Agent in charge of cloth contracts with the Cabot Manufacturing Company of Brunswick, Maine. This position he held until 1916 when he was promoted to the position of Superintendent of the Cabot Manufacturing Company. Mr. Eaton served as Superintendent of the Company until 1922 except for a period of nine months 1918-1919 when he served as a First Lieutenant in the Chemical Warfare Service in charge of Inspection and finishing gas mask materials. During these nine months he was stationed at Saylesville, Rhode Island.

In October, 1923, Mr. Eaton came to Clemson College as professor of Weaving and Designing. However, in 1925, he was transferred to the department of Carding and Spinning and it was in the capacity of professor of Carding and Spinning that he was serving the school when he was appointed Acting Dean of the School.

In 1926 there was some talk on the Clemson Campus and in the textile school of promoting the establishment of a Chapter of Phi Psi, National Honorary Textile Fraternity, in the Clemson Textile School. Being appointed by the late Dr. E. W. Sikes, it was the duty of Mr. Eaton along with Dr. Calhoun to study National Fraternities and make a report to Dr. Sikes. At this time, and upon the recommendation of these two men, the policy of allowing honorary professional fraternities to exist on the campus changed and the students of the textile school were allowed to apply for an active Chapter of Phi Psi, provided its membership would be made up of above average students. Had it not been for the recommendations of these two men Iota Chapter of Phi Psi would not have been organized in the Clemson Textile School at the time and it probably would not have attained the high reputation that it holds today. Iota Chapter was formed and presented with a charter on May 5, 1943. During induction period of the Fraternity in 1928, Mr. R. K. Eaton was made a member of the Chapter at Clemson.

Mr. Eaton is the author of numerous articles which have appeared in the trade journals of the textile industry over a period of time. He is co-author of the textbook used in the school's course in Roving Frames. On the campus he is admired and respected by all who know him, being a charter member of both the Forum Club and the Fellowship Club.

PLANNING FOR PEACE

(Continued From Page 3)

blems now but we can prepare for some of the emergencies.

In our war program, we have a definite objective of victory. We are planning and preparing for many of the possibilities of war, both offensively and defensively, that may occur. Some of them will happen, some will not.

In looking over the post-war situation, there can be the definite objective of peace and we can set up certain definite objectives, both offensively and defensively, that will be our goal.

Our schools and colleges must be alert to the changes in our industrial life. They must lead and not follow the plan. They must discover and interpret rather than become rigid and decadent.

Our business men and political leaders must look into the kaleidoscope of myriad colored problems and try to discover what can and must be done.

Our ministers must try to find a way of presenting the divine plan of life so that it will appeal to the masses and give them an underlying philosophy upon which to build their lives.

Our great public must arouse itself from indolent thinking and selfishness and look to the post-war morn and make plans for the new day.

Humpty Dumpty must look far and wide so that he will not be knocked off of the wall again. The new world will be a much better world or a much worse world. There will be no return to normalcy as we have once known it. The world is a little place and all people are physically neighbors.

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Research As An Essential In The Textile Industry

BY JOHN T. WIGINGTON

Director, Division of Textile Research, The Cotton Textile Institute, Inc. National Cotton Council of America

A recent editorial of Dr. William P. Jacobs, Executive Vice-President and Treasurer of the South Carolina Cotton Manufacturers Association began with the following sentence: "A great writer has said that nothing is permanent except change." Every cotton manufacturer should have this sentence reproduced and displayed prominently in his office where it will serve to keep him receptive to new ideas and give him vision with respect to his job and its possibilities.

Cotton textiles have for the past two years enjoyed one of the most prosperous periods in the history of the industry. With a third fewer active cotton spinning spindles than were in operation during World War One, the textile industry is now consuming at the rate of approximately 1,000,000 bales of cotton per month, as compared with some 500,000 bales per month during World War One. Enormous quantities of fine combed cotton yarns and cotton fabrics have gone and are going into equipment for our armed forces, as well as to the civilian trade.

This tremendous increase in production merits particular attention and demonstrates that research, technical skill, and a willingness to make changes have been responsible for new yarns, new fabrics, and new finishes. The industry is to be complimented upon its achievements; however, now is the time to hoist the RED FLAG of warning; now is the time to plan for post-war textiles. With the close of the war, the present war-market will collapse. In the post-war civilian market, cotton manufacturers will be confronted with keen competition from synthetic fibers such as aralac, nylon, and rayon, as well as from natural fibers such as silk, flax, hemp and jute.

How will the industry meet this competition? To do so, it is imperative that the cotton manufacturers devote more of their time, more of their effort, and more of their money to research. Competition can be met successfully only by a well-planned and well-executed program of research, in which the chemist, the physicist and the engineer will bring their training to bear on the development of the latent possibilities of the cotton fiber. The chemist and chemical industries have already been of tremendous help to the cotton textile industry by contributing new dyes, new bleaching agents, mildew-proofing preparations and permanent water-repellent processes. These developments have meant much to the industry but they are but a beginning. The post-war chemist may so treat short staple cottons as to give them the properties of strength found in jute and sisal; the absorption properties found in flax; the luster of silk; and the rough finish characteristic of wool.

For a quarter of a century Mr. Douglas Woolf, Editor of TEXTILE WORLD, has been trying to awake the textile industry to the value of research. The following is quoted from his editorial in the December, 1942, issue.

"MR. TEXTILE MANUFACTURER, do you know just what you have to do to make research work for you and to insure your survival over the war period, with inevitable dislocation of our economy, and to save a place for you in the post-war readjustment?

"Here are the answers:

"1. You must shed your conception of research as a force that is all right for the automobile manufacturer, the electrical-equipment manufacturer, the paper manufacturer—and take to your heart the realization that research is the answer for you, your company, and your industry.

"2. You must grasp the fact that, in a decentralized industry such as textiles, only a relatively few firms can engage in individual efforts compatible with the need. The great majority of companies must herd together in an all-out cooperative job. And in this, they will find those relatively few big concerns on their side. The record shows that those companies have been in the vanguard of the cordinated research movement. The reason is that, in the fight of the textile industry for survival, there is and should be no intra-competition.

"3. You must accept the fact that research is not a gift of the gods. It is something that you yourself must create and support and pay for—both in money and in the time of your key-men.

"4. You must know that control laboratories do not represent research; they are merely a part of your operating job. To share in the results of cooperative research, you must develop an organization, relative to your size and your financial ability—whether it be one man with a microscope, or a group of men in a well-equipped laboratory. This must be your connection with the industry's program: your chance to utilize in your own mill the results of that program."

The recent announcement of the organization of the North Carolina

Textile Foundation indicates recognition on the part of North Carolina textile manufacturers of the urgent need for textile research.

Today various agencies such as the federal government, educational institutions and industrial groups are working on cotton problems; fundamental research, applied research and consumer research are being carried on.

The main function of the Division of Textile Research of the Cotton-Textile Institute is to coordinate all research agencies concerned with cotton, and, in every way possible to bring their efforts to successful fruition. Toward this end the Division analyzes the objectives and potentialities of the various projects and makes available to cotton manufacturers such practical findings as may be useful to them. It serves as an agency whereby promising developments in the research laboratories are carried to the manufacturers to be tested as to their suitability for production on a commercial scale. In like manner the Division is a medium through which problems within the industry are carried to research laboratories for solution.

"COTTONLEATHER"

(Continued from Page 10)

would materially boost the use of cotton and this fact caused the National Cotton Council of America to request complete information.

With civilian shoe production cut about 150,000,000 pairs during 1943 because of the use of leather in the armed forces and the rationing of leather shoes for civilian use, many manufacturers are planning to make non-rationed shoes. "Cottonleather," it appears, is the choice of all manufacturers who have tested it and who may be able to obtain the right to use it. Approximately 500,000,000 pairs of civilian shoes were manufactured last year.

At present, this newly developed cotton fabric is being manufactured in six-inch widths. However, arrangements have been made and the machinery has been adapted to manufacture widths up to thirty-two inches, which will permit greater economy in cutting soles. While the present price for soles made of "Cottonleather" is higher than that of soles of better grades of leather, President Howard Snow is confident that with mass production methods in operation the prices may be made equal to those of the best leather.

"Cottonleather" is exciting the interest of manufacturers of products other than shoes. A transportation company is experimenting with it as a possible substitute for metal and linoleum step and floor pads. One of the Nation's largest automobile manufacturers is testing it for a fender support application. Other suggested uses include motor mounts, shockproofing, reinforcements for heavy bags and pounches and many other uses where leather has heretofore been required.

There are many uses of cotton as substitutes for strategic materials in this war which are now in use. Don't be surprised when other uses for cotton are announced in the coming months. Yes, cotton definitely has a great future in fabrics. Hail, King Cotton!

"PLANNING FOR PEACE"

(Continued from Page 15)

Socially and economically they must be neighbors and that means they must be mentally neighbors.

We must not wait for peace to make our plans. We must begin with the blue prints now, even though they must be changed as the period approaches. The problems of peace will be as difficult and as expensive as the problems of war. In war, we plan for a few years only; in peace, we plan for a life time. We must look in all directions.

This is the American way. This is the problem of the American system of free enterprise.

PHI PSI FRATERNITY TO MAKE AWARD

BY L. H. HANCE, '44

In coordination with Mr. A. E. Snyder, chairman of the committee of the presentation of Phi Psi awards by the National Chapter, the textile department of Clemson has been busy selecting the student who will fill all of the necessary qualifications. The award is to be made on Honors Day in May and will not take the place of the textile chemistry award by the Textile Colorist or the textile engineering award for scholarship. The Phi Psi award will be given to a senior student taking some course in the textile field. Membership in Phi Psi does not constitute a prerequisite.

Acting dean, Mr. R. K. Eaton, has already appointed four members of the faculty to assist in making the final choice. The award itself is to be a beautiful pocket-book and letter-case set, made of Ostrich leather and lined with calf-skin. Inside each article will be embossed the coat-of-arms of Phi Psi Fraternity and the recipient's name printed in gold. In addition he will be presented with a suitably engraved certificate, certifying that this honor has been given to him.

The basis for selection which the faculty committee will use as a guide is as follows:

Scholastic standing (analytical powers, accuracy, reliability)	60 points
Leadership	10 points
Personality (poise, maturity, sociability, and personal appearance)	10 points
Initiative	10 points
Loyalty and Courtesy	10 points
	100 points

Since the alphabetical rating systems vary, a man to be eligible should have an average of 80 or better, or what would ordinarily constitute a B rating in most systems.

Cotton--The Present And The Future

BY T. A. TURNER, JR., '44

The tremendous sales of finished textiles to the Army and Navy have made textile producers very cautious in buying the best grade cotton. Military specifications have always been tough to live up to; margins on war contracts are satisfactory. Because of this, cotton mill men lean heavily toward the safe side and buy the best raw cotton they can find. Of course this means cotton of long staple and good variety.

The Department of Agriculture is growing more alarmed daily because of this situation. The trend toward mills using higher grades of cotton is thus depleting reserve stocks of the higher grades more rapidly than stocks of other cotton. Consequently, the future holds in store for the mill men a prospect of heavy stores of low grade cotton and nothing else. It follows that if there is not more raising of best grade cotton this year, the military specifications must necessarily decrease.

People may ask about the surplus of lower grades of cotton. This surplus does not present any difficulties. The war has awakened the ingenious American mind and every day countless patents are being received in Washington on synthetics and plastics made from short staple, low quality cotton. Eventually these patented articles will find a great many uses in our everyday life and will consume most of the lower grades of cotton.

The question arises, then, as to where we will obtain the high grades of cotton necessary to keep our Army the best dressed Army in the world. With longer staple in demand, the government encouraged increased seedings of this type for last year's crop and witnessed a wonderful response. In the main cotton belt, shifts from short and medium staple to long staple were sharp enough to consume the entire available supply of long varieties.

In the irrigated belt of Arizona and New Mexico acreage of the American-Egyptian long staple was up 51% over 1941 and 202% over 1940. Altogether last year was the biggest year in proportion of long staple cotton to the total crop. However, this year promises to even top that record of last year. This year the consumption prospects at the moment exceed twelve million bales. This means that a second year of digging into cotton surplus is not to be avoided since the 1942 crop was estimated at slightly less than twelve million bales.

This is progress even though about one year's prodcution of cotton is still stacked up in this country. Stock in public storage and compresses in June, 1942, had dropped 20% below a year before but still stood at the figure of 8,459,000 bales. At the same time cotton stocks in mill hands were at a record high for June 30, totaling 2,441,000 bales.

At worst, however, cotton's future is looking much better than anyone had believed before Pearl Harbor. Domestic consumption has boomed so sharply that it was about 40% higher than any year before the 1940-1941 season, totaling approximately 11,000,000 bales. However, the new World War has produced blockades and shipping shortages. It produced a lack of exchange with which to buy foreign goods, thus concentrating foreign purchases only on those items needed for the prosecution of the war. As a consequence, cotton exports have fallen to an extreme low. Exports of American cotton during the 1940-1941 season amounted to only 1,100,000 bales—an 82% decline over the 1939-1940 crop season.

Then, with all these facts before us, we like to think of the future of cotton. Rayon came into being only a few years ago; plastics have just been born. Trucks are taking the place once occupied by railroads and water is giving up to the Diesel motor in the production of power. New methods, new machines, new products, continually displace the old because of the profit motive or the progress motive.

Whatever our desires may be, however great our needs, cotton manufacturers will continue to meet the changing conditions and necessities of the times. The cotton textile industry has survived many reverses and will undoubtedly meet with many more which will throw it off balance in some way. However, regardless of the shape of things to come, the cotton textile industry is daily growing and will continue to grow. The future of today's textile master is bright.

(*Editor's Note*: Statistics in this article taken from "Business Week," August 15, 1942, issue).

"RENAISSANCE"

(Continued from Page 5)

ton lint and cotton fabrics. These last are called the Cotton Fiber Research, Cotton Procession, and Cotton Chemical Finishing Divisions.

"The Cotton Fiber Research Division conducts investigations on the chemical and physical properties and structure of cotton fiber as these relate to its utilization, and works on methods for modifying these properties of the fiber to suit requirements of specific uses. Current work includes research on stabilization of nitrocellulose from cotton and cotton linters and the impregnation of cotton fiber to make cotton fire-proof and mildewproof and to give it other properties desirable for specific uses.

"The Cotton Processing Division conducts research on the development of new and improved cotton products for specific uses and seeks to develop new methods and machinery to improve the quality and lower the cost of cotton products. To provide equipment for this Division, a textile mill 95 feet long by 62 feet wide was constructed in the industrial pilot-plant wing. This mill occupies three floors and is completely air-conditioned, with an individual air-conditioning unit for each floor, so that the temperature and humidity on one floor can be varied without affecting any other section of the mill. The degree of control of both temperature and humidity is greater than that in the best air-conditioned office. To insure such a high degree of atmosphere control is expensive, and although the mill occupies only a part of the industrial wing of the laboratory, its cost is over $95,000. In air conditioning this mill, our purpose was to make possible the exact reproducibility of results and their application in the cotton textile industry. Besides being able to reproduce the results of experimental runs, we want to be able to make runs under various controlled conditions representing the climate prevailng in particular localities throughout the country. This $1,000,000 experimental mill includes modern standard textile machinery for all steps in the manufacture of cotton fabrics, from opening through weaving, and the necessary auxiliary equipment such as that for winding and warping. There is also connected with the mill a modern testing laboratory, equipped with machines for making a wide variety of physical tests on textiles.

"One of the projects on which the technologists in this Division are now working is the development of suitable cotton bags for handling raw sugar. They have just finished spinning yarns and weaving them into fabric for making 400 experimental bags to handle Hawaiian raw sugar."

"Another current project is the development of a suitable cotton binder twine to supplement supplies of binder twine made from imported sisal and henequen."

Thus, we see that men are busy in this great laboratory carrying on various research problems connected with textiles. Additional work is being done in finding a way to utilize lint cotton to supplement linters for the manufacture of smokeless powder. The Cotton Chemical Finishing Division is working on the development of new and improved chemical finishes for cotton products. The very long and complicated research projects are being set aside at present in order to solve some of the smaller, immediately urgent problems connected with war production. When the time comes the Southern Regional Research Laboratory will take up the job of continued research in a world at peace.

Simultaneously with the develop-

(Continued on Page 23)

Compliments Of

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Phi Psi Service Flag

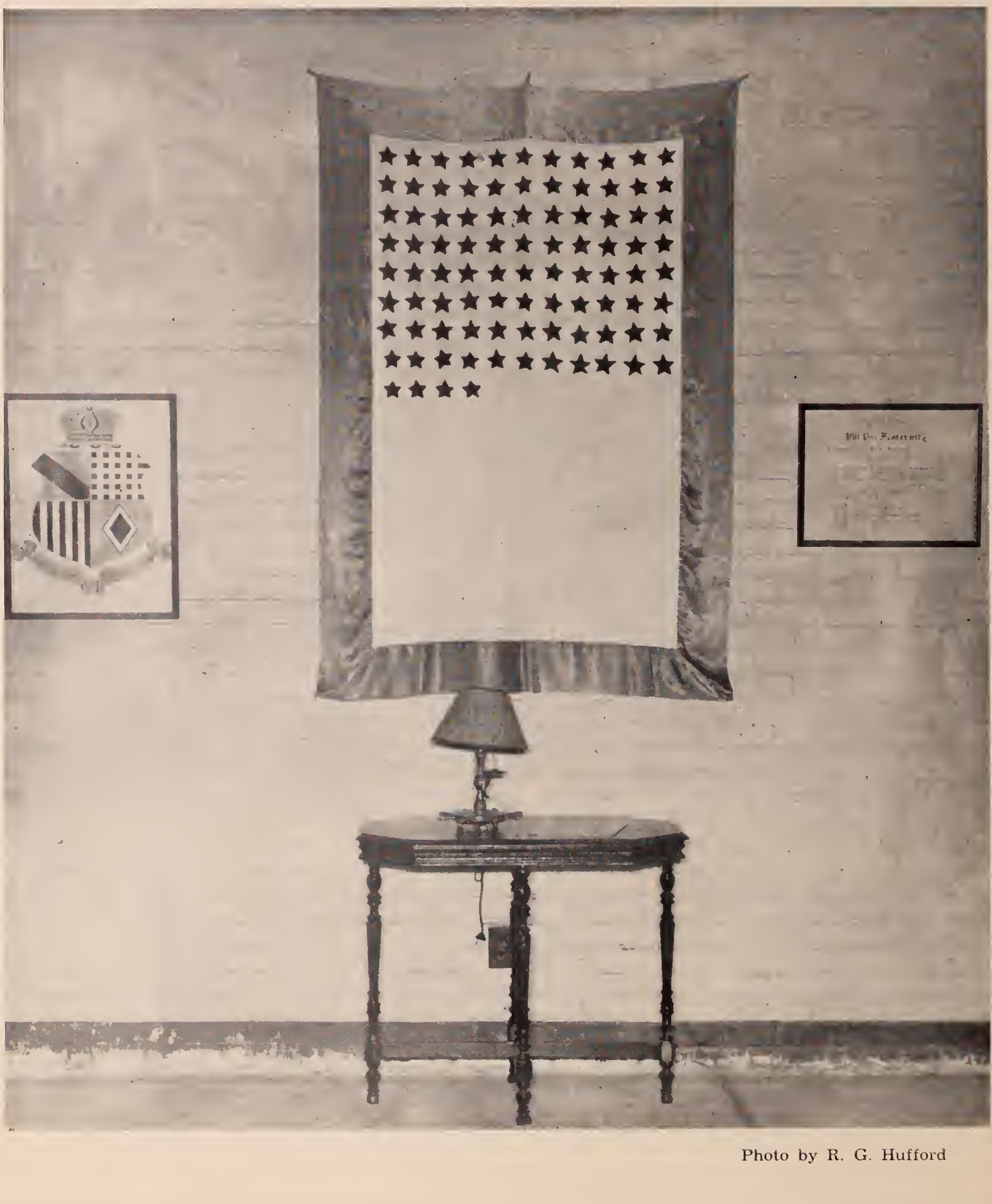

Photo by R. G. Hufford

Phi Psi Service Flag Dedicated

Former members of Iota Chapter now in service honored

BY M. D. MOORE, '43

In more than one way Iota Chapter of Phi Psi, located at the Clemson Textile School, has helped and is continuing to help in the struggle to rid the world of war and abolish the menace to Liberty and Democracy. Besides setting aside funds for the purchase of War Bonds, the Chapter has supplied the Armed Forces of the Nation with many capable officers.

Recently, in an impressive ceremony held in the Fraternity Room in the presence of the active members of the Chapter and the Faculty of the Textile School, a service flag made by the members was dedicated and installed. The dedicatory address was delivered by Mr. R. K. Eaton, acting dean of the school and a number of Phi Psi. In his address Mr. Eaton cited the fact that a service flag representing the combined Chapters of Phi Psi during World War I contained one hundred sixty-four stars, seven of which were later turned to gold. He stressed the importance of the fact that already Iota Chapter alone had supplied over half this number in World War II.

Of the ninety-five former members of the Chapter, only one has been reported as a casualty. On February 5 word was received that Lt. C. E. Spires, Class of 1940, had been injured in battle but was recuperating at a base somewhere in England. It is the sincere hope and prayer of the Chapter that Lt. Spires will soon recover and that none of the stars on the flag will ever be turned to gold.

The flag, made by the members of the Chapter, is three feet wide and five feet long and consists of a white field upon which is a blue star for each former member now in the service. The white field is bordered with red silk. Hanging with the flag on the wall of the room is a scroll upon which are the names of the former members and the number of the star which represents each.

It is with great pride and respect that we herein print the names of those former members of Phi Psi, Iota Chapter, who are now actively engaged in the fight to preserve the freedom of this Nation and of other peace loving Nations of the World.

The Stars on the Flag number from left to right and down.

L. D. Swearingen '32
H. W. Fogle '32
W. C. Crain '29
J. A. Cook '29
J. C. Childers '30
J. E. Baker '32
J. V. Walters '33
G. E. McGrew '33
D. H. Kennemur '33
E. W. Hollingsworth '33
W. G. Ashmore '33
C. D. Wyatt '34
R. F. Jenkins '34
J. B. Day '34
R. A. All '34
W. W. Webb '34
W. L. Triplett '34
P. L. Tobey '34
J. R. Thode '34
C. O. Stevenson '34
H. E. New '34
M. L. Huckabee '34
C. P. Gordon, Jr. '34
George Chaplin '35
H. P. Bridges '35
E. H. McCarter '36
T. B. Roach '36
J. C. Ballard '36
W. O. Hankinson '36
J. P. Woodside '35
H. D. Leitner '37
W. K. Lewis '37
R. E. Hilton '37
C. O. Browning '37
S. J. Craig '37
W. H. Cutts '37
T. F. McNamara '37
A. S. Sanders '38
P. R. Abercrombie '38
J. W. Anderson '38
R. R. McGee '38
A. L. Sanders '38
J. W. McSwain '38
R. W. Robinson '38
H. C. Avinger '39
W. E. Dunn '38
R. M. Denny '38
R. G. Carson '39
A. D. Graham '40
J. G. Smith '40
J. B. Frazier '39
C. E. Anderson '40
G. M. McMillan '40
J. H. Radcliffe '39
H. H. Cosgrove '40
J. H. Levin '40
H. H. Thomas '40
F. E. Culvern '39
C. V. Wray '40
J. A. Shirley '40
D. J. Ross '41
G. C. Jolly '41
J. L. Orr '41
H. V. Simpson '41
C. M. Zeigler '40
W. W. Foster '40
C. E. Spires '40
W. R. O'Shields '41
W. H. Carder '41
P. J. Burns '40
R. O. Holcombe '40
F. G. Cash '42
J. D. Christopher '41
G. W. Kirby '41
A. C. Nalley '41
P. W. McAllister '41
G. S. Wham '41
J. W. Howard '41
G. E. Williams '42
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Tate Horton '36
Allen Taylor '38

"Cotton Fights On Every Front"

Despite prevailing war conditions, Cotton Week will again be observed this year all over the nation during the period of May 17 to 22. It's main objective will be to enlighten the public to the tremendous contributions cotton has made toward the prosecution of the war. This year, instead of attempting to quicken the sale of cotton goods as in former years, the emphasis will be placed upon the conservation of cotton goods.

The war has increased the versatility of cotton to such an extent that it was decided to lay stress on this factor during Cotton Week this year. The uses that we have put cotton to since Pearl Harbor have shown that cotton products can be adapted to all climates and conditions unheard of before.

The slogan, "Cotton Fights On Every Front", was suggested by Colonel Robert T. Stevens and the poster on this page has been designed around this slogan. Over 400,000 copies of this poster will be distributed to every branch of the cotton industry as well as to civic organizations for display purposes.

The way in which the industry met the unparalleled demands of war was summed up recently as follows: "War has made cotton more than ever the universal fiber. Everywhere in the world cotton has gone to the front with our

(Continued on Page 23)

COTTON
WEEK
MAY
17 TO 22
COTTON FIGHTS ON EVERY FRONT

Here is the proof of the poster for the 1943 observance of Cotton Week. It is an exact reproduction of the official red, white and blue poster selected for this year's event. It can be used in making any size mat or electro that may be needed by those desiring to reproduce the poster design in advertising or other printed material. The full-size three color poster — approximately 16 by 20 inches — will be supplied without charge for display in stores, business showrooms and public places. The poster is adapted from a cartoon by the U. S. Quartermaster Corps.

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SHUTTLES
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TEXTILE LIGHTING

(Continued from page 11)

to supply a given amount of power to a mill are proportional to the power supplied and inversely proportional to the power factor at which it is supplied. Therefore, at power factors other than 1.0 the volt-amperes necessary to supply a given active power are greater than the active power itself.

This means that the mill would be getting power that it would not be paying for if the power factor were less than 1.0. Naturally, the power company will try to remedy this situation by barring the use of any equipment which results in the above situation. All reputable manufacturers of fluorescent lighting equipment include the power factor rating with the technical data supplied with the unit.

"COTTON FIGHTS . . "

(Continued from Page 22)

fighting men. It flies on our planes, rolls with our motors, sails with our ships, covers our guns and clothes and shelters our soldiers. It is at home in the tropics and a godsend in the Artic."

The merchandising aspect of the event will be concentrated for the most part on the types of cotton goods, apparel and home furnishings that happen to be in fairly liberal supply and on the many products that have been developed to take place of the numerous items forced off the retail shelves by the war.

In normal times, Cotton Week is celebrated in many cotton growing and manufacturing centers with parades, balls and special educational programs in schools and colleges. A recent survey by the Institute indicates that similar events will be held this year with some modifications in towns and cities located in the dim-out belt. All of these events will be built around the theme of cotton's contribution to the war.

"RENAISSANCE"

(Continued from Page 19)

ment of new laboratories, the various textile promotional organizations are at work fostering this new drive on research. Under the guidance of the National Cotton Council of America we have seen increased research activities in the state universities and colleges of the cotton-growing and producing section of our country. The State of Texas has set up a large research fund for cotton and cotton textiles. The National Cotton Council expects to coordinate the various research programs being carried on by the many textile promotional organizations. Under this plan the Cotton-Textile Institute will handle the research work within the industry itself. From its headquarters here in the Clemson College Textile School the Cotton-Textile Institute will work directly with the mills, helping them solve the various problems which arise directly out of the processing and manufacturing of cotton products. Among these problems we have already seen the development of higher card speeds and the use of cotton blankets on the slasher squeeze-rolls in place of wool blankets. These are examples of the many problems which arise in the mill. The Council also plans to carry on an extensive program in industrial and consumer research. This phase of research which has been neglected somewhat, will assume the duties of finding new markets and outlets for increased consumption of cotton goods. They are carrying on at present an extensive advertising campaign to promote the use of cotton products.

Thus, we can see that textile research is beginning to go places; this, however, is only the beginning! We are sure to see gratifying results in the near future.

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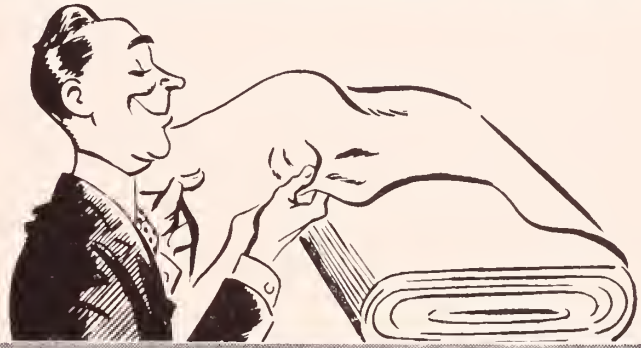

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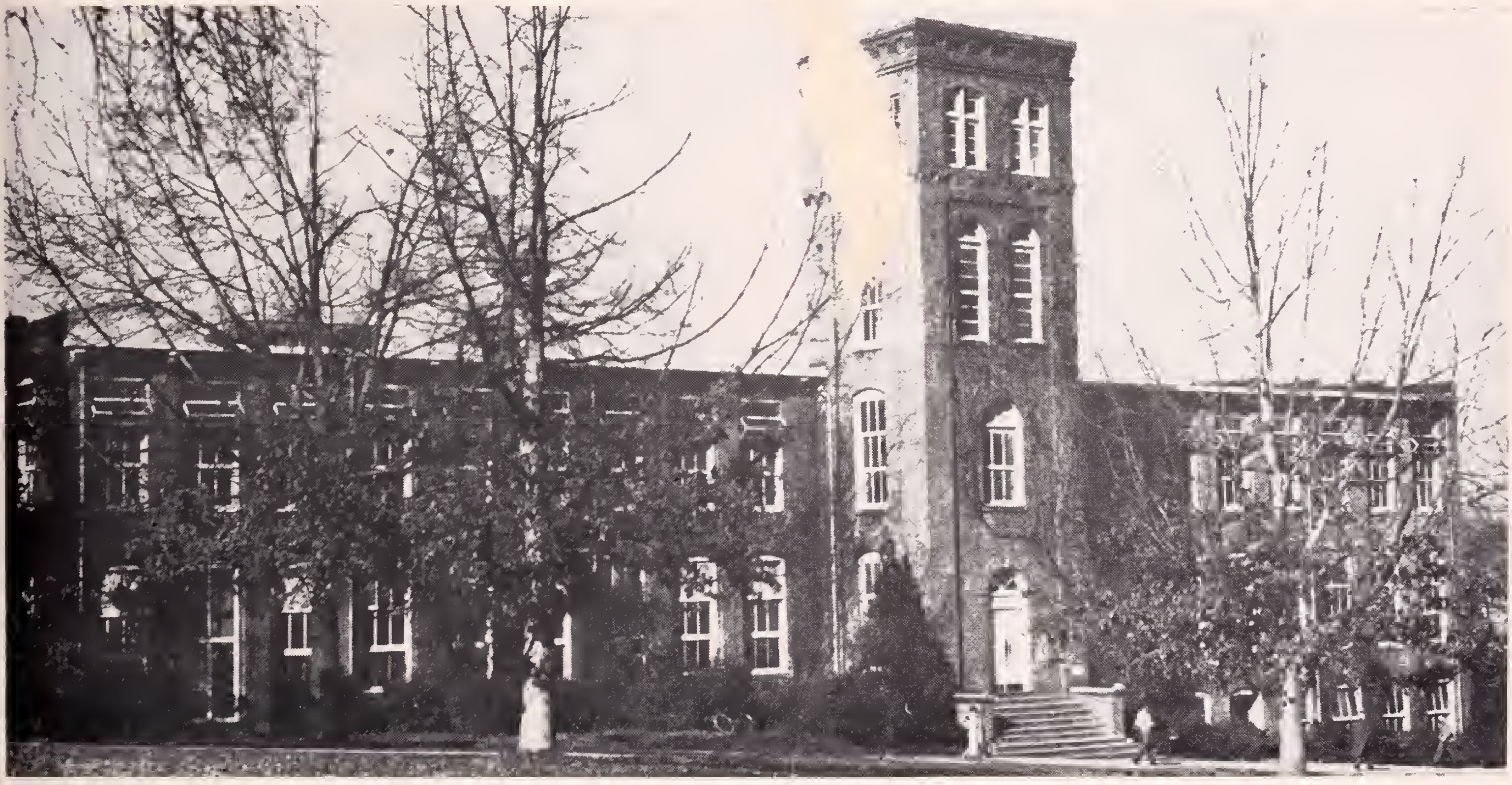
STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

Vol. 5 JANUARY 947 No. 1



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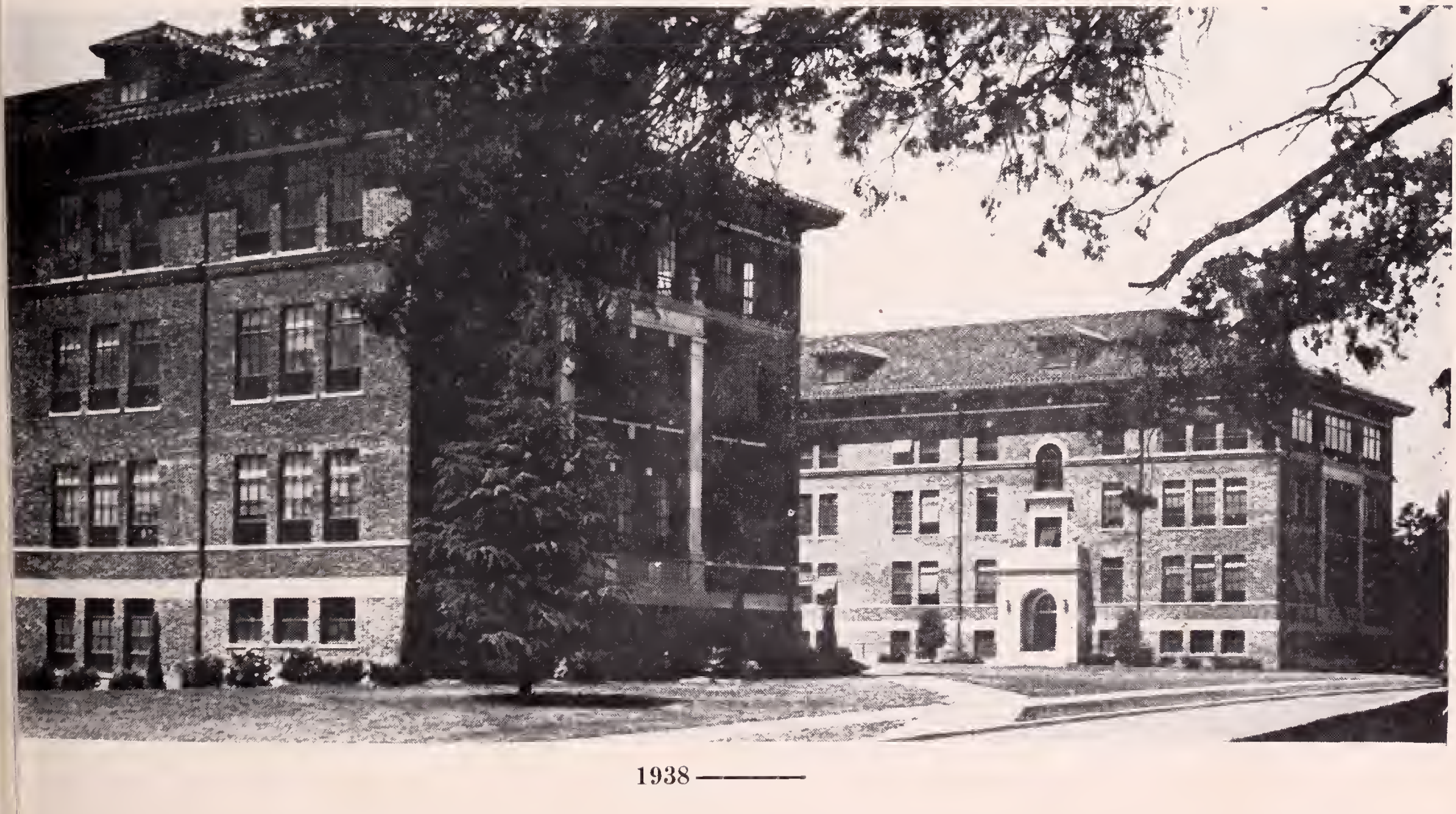

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Official Student Publication
Clemson Textile School

Vol. V JANUARY, 1947 No. 1

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In memory of those who made the supreme sacrifice, respectfully we make this

Dedication

"His grave a nation's heart shall be,
His monument a people free!"
—Caroline Atherton Briggs Mason

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Guest Editorial

By DR. CLAUDIUS T. MURCHISON

President, The Cotton-Textile Institute, Inc.

Dr. Murchison, a native of North Carolina, received his education at Wake Forest and Columbia University. After serving for a number of years as Professor of Economics at the University of North Carolina, he was named director of the Bureau of Foreign and Domestic Commerce of the Department of Commerce and a board member of the Export-Import Bank. Since November 1935, he has served as president of the Cotton-Textile Institute, Inc. He is the author of "Resale Price Maintenance" and "King Cotton is Sick" and co-author of "Management Problems" and "Culture Below the Potomac." We take pleasure in presenting Dr. Murchison's guest editorial.

The American textile industry stands on the threshold of a new world bright with promise.

Ahead of the young men about to embark on textile careers lie boundless opportunities.

In order to achieve the glittering goals that beckon to those with eyes to see, much training and much study are needed and much effort must be expended.

Already visible to those who have spent most of their lives in textiles are the outlines of a new industry that is being formed by the technical advances of the last decade. It is obvious to most that over the next few years the industry will be transformed by the application of wartime achievements and discoveries in the fields of chemistry, engineering, plastics, electronics and possibly atomic power to textile manufacturing processes.

Also, a revolution is taking place in cotton agriculture what with the development of picking machinery and other mechanical devices that point to ample supplies of the white fiber at prices competitive with the rest of the world.

But these impending changes can be made effective only by men of sound training, equipped by schooling and experience to master the scientific knowledge of their time and translate it into terms of textile processing. Men of this sort will be the direct heirs of a great tradition that began back in the late 18th century when men of the type of Hargreaves, Arkwright and Slater applied Watt's discovery of steam power to the operation of spindles and looms and launched the industrial revolution. Also, among this noble company must be included Eli Whitney who not only invented the cotton gin but was the father of mass production.

The mechanization of cotton cultivation, the application of chemical discoveries to the production and finishing of both yarns and fabrics and the development and perfection of new mechanical devices for mill operations are the immediate tasks of the industry. To these must be added the long-range problems of keeping pace with the dynamism of the American industrial and economic structure, of finding new outlets for the products of mills and of anticipating the needs of the customers of the industry.

Given the present high level of textile education in the United States, the cotton textile industry has every reason to feel confident that the textile technicians and textile scientists now being trained will fulfill the mighty work ahead of us.

Deering Millkin Research Trust

By *H. R. VALERIUS*

Here in the Clemson College School of Textiles one can readily see that research is being conducted by the textile industry. Government experiments have been carried on here for quite a long time. About a year ago, the Deering Milliken Research Trust was established in the modern textile building of this school. This Research Trust is under the direction of Dr. Donald G. C. Hare.

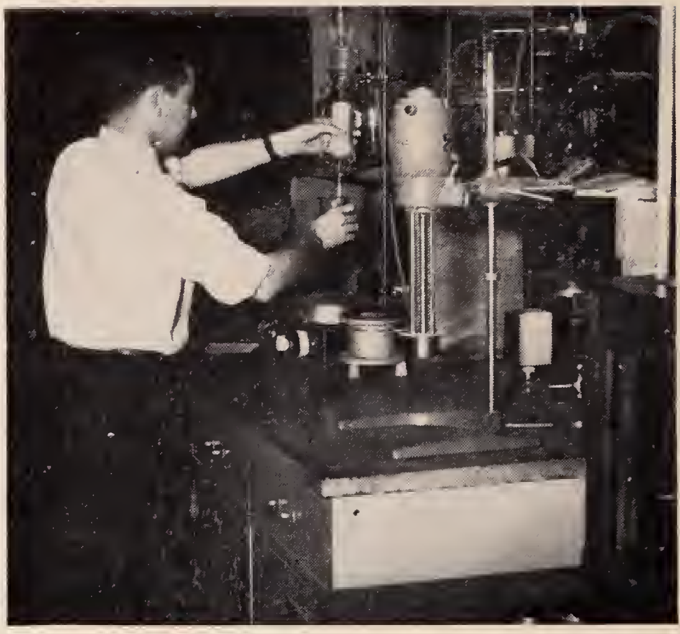
Dr. Robert F. Poole, President of Clemson College, has long expressed a desire for additional research by the textile mills in this area and by the Clemson Textile School.

The Deering Milliken Company, which controls a group of textile mills throughout the country, has a research laboratory in Connecticut in addition to the one here at Clemson, South Carolina. Each of these laboratories has a staff of about forty, consisting of Mechanical and Electrical Engineers, Chemists and Physicists, all applying their skills to textile problems.

There were several determining factors for locating the Research Trust at Clemson. Not only is the South becoming increasingly important to the textile industry, but also Clemson is near many of the Deering Milliken mills, and it was felt that the school and the laboratory could be of mutual assistance. From time to time, the professors of the school are called upon as consultants. Some of the advanced students are hired for part-time work which provides both employment and invaluable experience.

Dr. Norman C. Armitage, assistant director and patent counsel of the Trust, stated that because of the relatively short time that work has been underway here, no startling results have been produced, but that many improvements have been developed. Research is being conducted in such basic categories as fiber construction and measurement, and on tables for the effect of humidity in the different processes.

Research for tangible savings has been done in connection with sizing. A certain amount of size is necessary in processing yarn for the production of cloth. If the percentage of size is reduced, difficulties arise. Size is an expensive item to a large textile mill; therefore, if the amount of size can be materially reduced or eliminated without a decrease in the quality or quantity of the product, a substantial saving for the mill will be realized.



W. W. Webb, at work in the chemistry laboratory of the Deering Milliken Research Trust, completes the extraction of yarn in determining the per cent of size in the yarn.

The economical spinning of rayon presents a problem for long range study. Cotton and woolen fibers have been utilized by civilization for many thousands of years, and the machinery used in making fabrics from these materials has been developed, improved and standardized through these thousands of years. Rayon and synthetic fibers of other types have been known for but a relatively short period of time. Because there was no known machinery for the processing of these new chemical filaments, the existing cotton and woolen machinery had to be used, even though there existed such basic differences in the physical characteristics of the synthetic and natural fibers. Consequently the endless filament had to be cut or broken into staple, paralleled and then made into an unbroken thread again. Only now is research in the development of machinery for processing these synthetic fibers beginning to catch up with the advancements made in the production of new chemical filaments.

In a brief discussion with Dr. Hare, he gave the following information concerning some of the work being done:

"The laboratory is developing a method of spinning the continuous filament rayon directly into yarn without necessitating the normal processes encountered in handling staple fibers.

"An extensive chemical program is being carried on. A long range program toward the improvement and standardization of wool finishing has been underway for about a year. Investigations in the finishing and shrink-proofing of rayon, particularly from fabrics made from the special yarn spun here, is the subject of a major project, as are ot—her specialized problems having to do with the handling of other sqnthetic fibers."

Private research laboratories of this type are not the

(*See page* 23)

"Operation Dixie"

DR. JAMES E. WARD

Dr. Ward, who received his education at the University of Virginia, now serves Clemson College as Head of the Social Science Department of the School of General Science, and as Professor of Economics and Government.

As a Public Panel member and an arbitrator of the American Arbitration Association, he has had ample opportunity to study and to know well the subject he now discusses, "Operation Dixie."

One of the South's, as well as the nation's, most pressing problems is the elimination of labor-industry disturbances as a means of settling disputes that arise in industrial relations. If one could gaze into a crystal ball and see the best methods of solving this problem, he would have both management and labor paying homage to him.

But alas! There is no one who can with absolute certainty speak. There are many who have and will come forward with a suggestion—maybe some will dare to say that theirs is the only answer. Perhaps there is no one answer. Maybe the problem can only be solved by a combination of approaches.

Be this as it may, the writer's experience with the War Labor Board and in general arbitration work for some years has convinced him that management and labor in the South must learn to make collective bargaining work on a voluntary basis if there is to be any cessation of this continual wave of strikes and lockouts. Precious time is wasted when a governmental agency, or some one else, is called in to help settle a dispute which could have been settled by the parties themselves either by conciliation or by a third party on a voluntary arbitration basis. These means of settling disputes are typically American and imply no compulsory features as do some methods which might be employed.

Voluntary arbitration means collective bargaining and this means unions. The South has long been anti-union, but this is not as true today as it was ten years ago, and all the blame or credit (depending upon your viewpoint) cannot be attributed to any or all government legislation. Public opinion in the South is changing. Such cities as Atlanta, Birmingham, New Orleans, Mobile, Dallas and Houston are reasonably "friendly" to unions and there are at least 30,000 CIO members in Memphis. This is the city in which, you will remember, its political boss, Mr. Crump, stated that the CIO "would never be allowed to light."

Another factor changing the South's traditional attitude is the fact that the South has already been "cracked", and that many men and women returning from war industry to prewar jobs are convinced of the value of union backing in industrial disputes.

Other union partisans have been found in some war veterans who, although glad to be home, are impatient with the "status quo" and are willing to set off a firecracker by whatever means at hand.

The primary factor in breaking down the anti-union attitude of the South has been the work of the unions themselves. More brains and energy have been expended in an unceasing flow to propagandize this area. The hard-boiled, tough-fisted labor leaders of yesterday have given way to the persuasive, "smooth talking" leaders of today.

Even now the AFL and CIO are putting forth great organizational drives in the South. The AFL boasts of over two million members in their Southern membership. More than a quarter of a million have been signed since

(*See page* 22)

Information for this article is taken from "Are You Sure You Are Using the Right Cotton?" leaflet prepared by the Cotton-Textile Institute, Inc., Division of Technical Services, Box 151, Clemson, S. C.

Trainees in the fiber analysis laboratory at Clemson witness a demonstration of the use of the Pressley Flat Bundle Fiber Strength Tester. Demonstrator is Helen G. Beasley, Fiber Technician of the Cotton-Textile Institute, Inc.

FIBER ANALYSIS LABORATORY

By H. R. VALERIUS

There are many people who do not know that classes for women, as well as for men, are offered in the Clemson textile building. Since October 1944, the Cotton-Textile Institute's Division of Technical Service, directed by John T. Wigington, has been conducting classes for training cotton fiber technicians in its cotton fiber testing laboratory in the textile building at Clemson College. This training program is unique in that it is the only one of its kind in the country.

The program was originally established as a research project for the Institute's member textile companies and was later modified to include the training of laboratory technicians. Since the inauguration of the training project, slightly more than two years ago, sixty-five technicians have been trained.

The classes at the laboratory are designed to train the laboratory workers of cotton mills to become experienced in cotton fiber testing. Many cotton mills have found it to their advantage to maintain fiber research laboratories which enable them to know more about the cotton they are using than the usual grade and staple length classification. By conducting tests to determine the fiber length, fineness, maturity and strength, a product of better quality can be obtained.

As stated in a Government report, "The staple-length designation of a sample of cotton, as determined by customary classing methods, indicates the length of a "typical portion" of the fibers in the sample. Uniformity of fiber length, as well as other fiber properties, probably influence to some extent the classer's selection of the "typical portion" of the fibers upon which the staple length designation is based. In general, there is a fairly close relationship between the staple length as designated by the classer and the fineness and the strength of the yarn that can be manufactured from the cotton. These relationships, however, are influenced by other fiber properties, the more precise measurement of which requires special laboratory equipment and techniques."*

Cotton mills from Maine to Alabama have sent employees to the Clemson laboratory for this training. The course requires from eight to ten weeks of study and practical application of fiber analyses.

Entrance requirement for the students is a high school education. Previous laboratory experience is not necessary, although it is advantageous. The test methods and procedures developed by the Cotton Fiber Technicians of the Department of Agriculture have been employed as the basis for the Institute's fiber training program.

Members of the Cotton-Textile Institute may enroll their employees in this course free of charge. Helen G. Beasley, Fiber Technician for the Institute's Division of Technical Service, is in charge of the training program.

Some men have taken advantage of the training; however, in each class a majority of the students are women. Laboratory managers have found that girls are usually

(*See page* 23)

"Results of Fiber and Spinning Tests of some Cottons grown in Texas and Oklahoma, crop of 1943." Prepared in the Research and Testing Division, Cotton and Fiber Branch, Office of Distribution, U. S. D. A.

DEAN BROWN

Doctor Hugh Monroe Brown was named Dean of the Clemson College School of Textiles in September 1945, succeeding at that time Professor Robert K. Eaton, who had been serving as Acting Dean of the school since February 1943.

In addition to his duties as Dean, Dr. Brown is Head of the Textile Management Department.

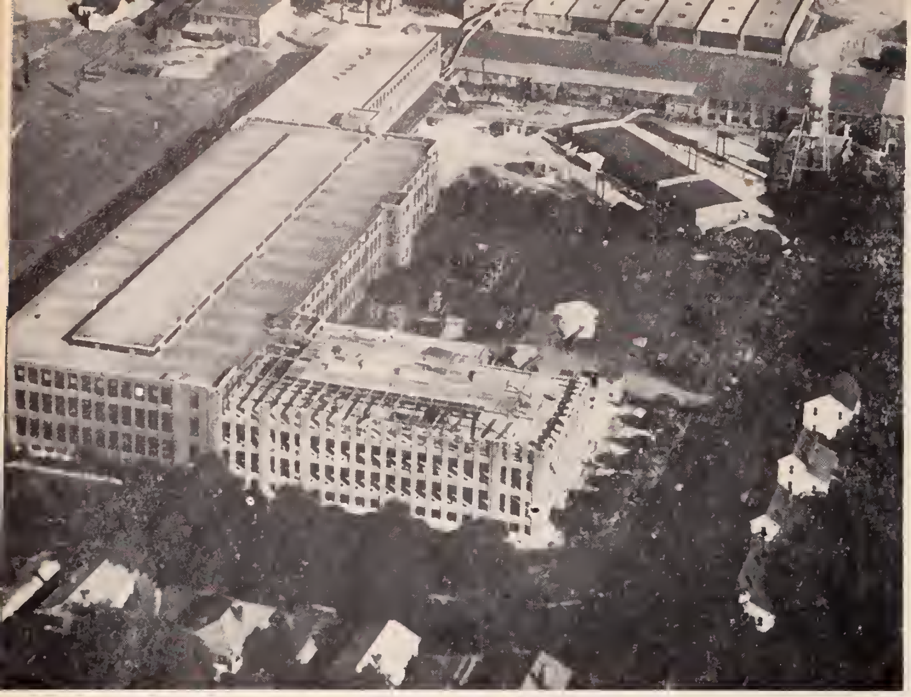
Dr. Brown was reared on a farm in Duell County, Nebraska. He received his A. B. and M. A. degrees from the University of Denver in 1920 and 1921, respectively. He was a teacher of mathematics in the Denver city high schools from 1922 to 1923. He then taught as a Fellow in Physics at the University of California from 1923 to 1927, at which time he received his Ph.D. degree in Physics from that institution.

It was also in 1927 that Clemson College received one of its most capable professors. From 1927 to May 1942, Dr. Brown served as Professor of Physics in the college's Physics Department. He was made head of this department in 1940, serving in this capacity until his succession to the deanship of the textile school. During this period, the professors of the Physics Department made equipment for the department, that was valued at $10,000. This represented the saving to the college of a large sum of money to be used for other purposes. Dr. Brown was granted a leave of absence from 1942 to 1945, during which time he worked on radar research at the Massachusetts Insiitute of Technology.

Here at Clemson, Dr. Brown is a member of Phi Kappa Phi, Sigma Phi, the Fellowship Club, the Forum Club, and Phi Psi, in which he has shown much interest.

Dr. Brown has also expressed a great amount of interest in the school's research program. He has extensively expanded the facilities for this purpose and has assumed an active role in the inauguration by the school faculty of several research projects. Dr. Brown is especially interested in the development and perfection of equipment for testing purposes.

Professor Eaton capably served the Clemson Textile School as Acting Dean for two and a half years after he succeeded Mr. H. H. Willis. He had the difficult task of solving the problems encountered by the school during the war. Professor Eaton is Head of the Carding and Spinning Department.



Your Camera and the Textile Industry

By JAMES K. WAITS

The camera is one of the most versatile tools the textile man has available for his use today. The advertising agencies have used it in many ways. This is clearly illustrated by the many beautiful pictures, in both black and white and color, which appear in the current issues of several magazines. The widespread appeal of pictures to the general public is clearly shown by the rapid and continuing success of such picture magazines as Life, Look, and Pic.

In the research laboratory, the camera is becoming more and more an indispensable piece of equipment. This is especially true in a laboratory, such as the textile laboratory, where the microscope is used extensively. The camera is being used most effectively in the mills and plants to show machinery set-ups, lighting conditions, etc.

There are many men in the textile industry who are amateur photographers. This article is addressed primarily to these men. Besides paying for that new equipment you may wish to buy, you will derive many hours of pleasure from recording some of the many phases of your profession. But first, a few words of warning. Although you legally own such negatives as you may expose, unless it is specifically stated otherwise, you may not publish pictures of such property as you may photograph unless you have permission from the owner. If you are taking a picture to be used in advertising, be sure to secure signed release from the models appearing in the picture. However, if, at the time the picture is being made, the parties included in the photograph are aware that it is being made for publication, not for advertising purposes, however, no release is necessary. It is a good idea to make an announcement to the effect that such pictures are being made for publication and allow all who wish to do so to move out of the picture area.

The photographs which accompany this article were made at Goldville, S. C., and show various stages of construction of the new addition built for the Joanna Textile Co. If there is construction work of any type going on around the plant where you are employed, make a photographic record of it. If you are capable of producing good results, the chances are that the management will very gladly buy them from you. No elaborate array of equipment is necessary to produce good results. It is not the camera that makes the picture, but the man behind the camera. One well known photographer who specializes in figure shots of dancers, uses the familiar box camera, exclusively.

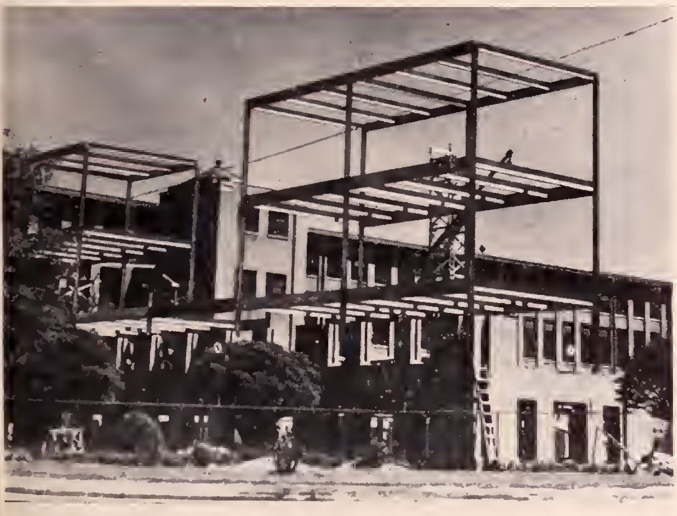
It is not necessary that you do your own processing, although it will be much cheaper and will increase the pleasure in your hobby. There are many capable finishers in the United States, and one is probably located near your home. If you wish, you may set up your own darkroom. Surprisingly little space is needed. The author has a darkroom in a small closet. This closet is about three by six feet in size. Shelves were built in both ends. In one end there is a shelf about three feet square and about waist high upon which the enlarger is placed. Above and below this shelf are others, of narrower width, used for the storage of paper, film, etc. In the other end is a shallow sink in which the processing is carried out. Below the sink is a rack holding the trays and tanks. It has been in use since about 1935, and the aerial shot on this page was processed and printed in this darkroom. The other two photographs were made by W. W. Waits of Goldville, a second hand in the spinning room.

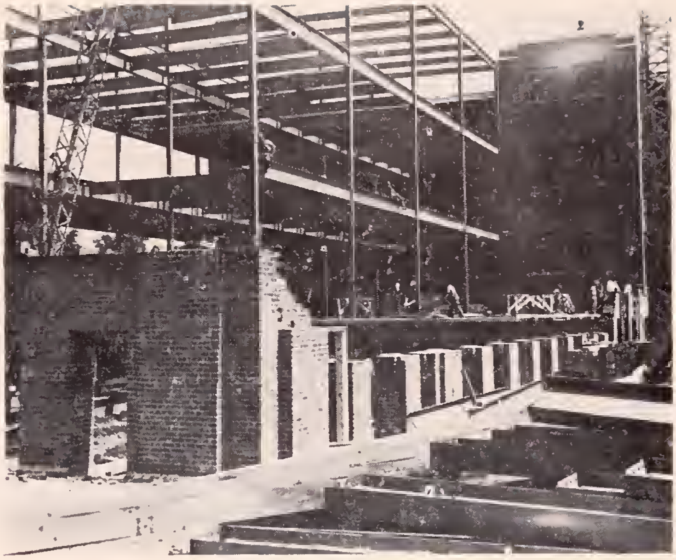
The aerial shot is one that could have been made by any experienced amateur. The camera, a German Ica, was originally purchased from its "liberator" for thirty dollars. The lens is a 5 inch, f 44.5 in a Compur shutter. A 3¼ x 4¼ Super XX film pack was used. The picture was taken about four o'clock in the afternoon and the exposure was 1/150 at f 11. The plane was a two seat Piper Cub. The picture was shot from the rear seat and through the plastic windows which should be avodied if possible. These windows are not optically corrected and a slightly blurred picture is almost sure to result.

There are a few precautions to be observed when taking pictures of this type. Use as large a negative as possible. If your camera is of the type having a bellows, protect it from the slip stream of the ship with a rigid shield attached around the bellows. This shield may be made of light metal or heavy cardboard. Otherwise, "bellows' flutter" will result in blurred and fuzzy pictures. A light yellow filter, such as the K-2, is often necessary to cut through the atmospheric haze. Use a high enough shutter speed to eliminate a possibility of subject motion.

The other illustrations are the type more in the reach of the average amateur photographer in the textile field. These pictures were made with a 2¼ x 3¼ Speed Graphic, but they could just as well have been taken with almost any camera.

Photomicrography is another field open to the men who have access to a microscope. Where work of a purely technical nature is considered, such as in a research laboratory, professional equipment should, of course, be used. However, if this equipment is not available, a picture may be obtained by tilting the microscope so that the draw tube is horizontal and blocking up the camera, practically any kind will do, so that the optical axis of the microscope and the camera are the same. This is a rather makeshift method. A vertical stand, such as that used for vertical enlargers, or a heavy ring stand from the laboratory, is more convenient to use. The camera may be attached to the stand by means of a wooden block and a 1-4 inch bolt with 20 threads to the inch. This size bolt fits the American type tripod socket.





A compound microscope is generally designed so that the image is viewed at infinity, i. e. the rays of light are parallel to the eyepoint. Therefore, with the camera focused at infinity it will "see" the same thing as the human eye when an observer looks into the micoscope. It has been found that most people strain their eyes when looking into a microscope, so it is best to focus the camera at about 25 feet. The camera should be so adjusted that the eyepoint of the microscope falls in the center of the front surface of the camera lens. The regular illuminating system used with the microscope is used for the photographs. The exposure is best found by means of test strips. For example, if you have a roll film camera, select an average subject such as you will be photographing and make a series of exposures over as wide a range as is practical with the film being used. After the film is developed, select the best negative and use that exposure. It is best to start working with the low magnification objectives of the microscope. For a more complete discussion of photomicrography, it is suggested that the reader consult one of the standard reference books such as the one published by the Eastman Kodak Company, Rochester, N. Y.

Only a few examples are covered in this short article. There are many more that will suggest themselves to the individual. Only the main points have been covered in the examples shown. There are many books that have been published for the beginner and the advanced amateur. If more complete or technical advice is needed it is suggested that the reader consult such photographic books as are available.

Looking Back

Nineteen forty-six marked the fiftieth anniversary of Clemson's School of Textiles, the first textile school to become associated with a regular college. These have been fifty years of genuine progress, not only within the school itself, but in the industry and in the state as well.

When the Clemson Textile School was established before the turn of the century, the South was just beginning its program of industrial expansion. Since that time, the population of the state has increased about 45 per cent, the number of textile employees has increased more than two hundred per cent (although the production of cotton now is actually less than in 1896), and the number of looms has increased about 630 per cent. Surely graduates of the Clemson Textile School have played no small role in this tremendous expansion of the industry in South Carolina and elsewhere in the South.

The school has not stood by silently during these years of industrial growth. When the school was first established, improvements and modifications in manufacturing processes came almost entirely from within the mills themselves. Today, with the cooperation and financial assistance of the industry, the textile schools of the nation are playing a far greater role in the technical progress of the industry. The Clemson Textile School has for many years worked with the mills in this section, giving assistance through counseling and testing service when problems were encountered in the mills.

There is no definite method of evaluating the assistance which the school has been able to give. However, these intangible results have been recognized by the industry, a fact readily seen in the establishment of the J. E. Sirrine Textile Foundation, in which the cooperation of leading textile concerns in South Carolina was obtained.

Probably the greatest period of progress for the school was the sixteen years, from 1927 to 1943, during which time Mr. H. H. Willis served as dean. It was largely through the efforts of Dean Willis that appropriations for the present building were obtained from the South Carolina Legislature. Gaining the assistance of several mills in obtaning badly needed equipment for the school can also be credited to Dean Willis. He saw the school grow from an enrollment of about 75 students and a faculty of four in 1927, to an enrollment of 350 students and a faculty of fifteen in 1941. He worked closely with the Textile Foundation, Washington, D. C., in cooperation with which he edited a number of textbooks and laboratory manuals which were written by members of the faculty.

Growth of cooperation with the textile field is seen in the establishment in 1921 of the Cotton Spinning Laboratory of the United States Department of Agriculture, in the textile school. In 1944, the Division of Technical Service of the Cotton-Textile Institute organized its Fiber Analysis Laboratory. Only a year ago, the Deering Milliken Research Trust began research in a portion of the textile building.

The textile school has been supplying a steadily increasing number of well-trained graduates to the industry. A few more than nine hundred men have been graduated since the school was started half a century ago. Of this number, about seventy per cent completed the Textile Enginering course; sixteen per cent were graduated in Textile Chemistry and Dyeing, 9.5 per cent in Textile Industrial Education, and 4.5 per cent in Weaving and Designing. The last two courses are no longer offered by the school.

On many occasions in the past, meetings of various textile organizations have been held in the textile building. Often these meetings have been under the direction of members of the faculty who have been called upon to make addresses and to lead discussion groups.

The school's growth has been gradual but progressive. At present there are four separate departments within the school: the Textile Management Department, headed by Dean Hugh M. Brown; the Carding and Spinning Depart-

(*See page* 21)

Looking Ahead

An all time high in enrollment, an enlarged faculty, additional research facilities, more and more cooperation and coordination with industry—with all of these factors in evidence today, the belief of President Robert F. Poole that Clemson's School of Textiles "will become second to none in the nation" is well-founded.

The outlook is bright. The increasing need for college-trained textile men has successfully brought into being a feeling of mutual helpfulness between the school and the textile industry. This feeling gives added strength to the belief in a solid future for the textile school.

The textile building itself, valued with contents in 1945 in the Survey Report of Public Higher Education in South Carolina, made by the Division of Surveys and Field Services of the George Peabody College for Teachers, at $545,000, and containing fourteen classrooms, twenty-seven laboratories, two shops and a lecture room, is easily capable of accommodating a much greater enrollment and many additional research laboratories.

The establishment of the J. E. Sirrine Textile Foundation has made available a great portion of the funds so necessary in carrying out the proposed projects of the school. Already more than $800,000 has been contributed to the Foundation by the participating mills. It is probable that the Foundation funds will, in part, be used for improving the faculty of the school and for scholarships and assistantships.

Approximately $100,000 for the purchase of machinery either has been allocated by the college or has been provided by the textile industry. At least one type of each machine used in the manufacture of cloth—from the opening through the cloth finishing processes—will be added. Included will be a seven-cylinder rayon slasher, a high speed warper to be used for both instruction and research, a centrifuge extractor, a tenter frame, new package, piece and skein dyeing machines, and other pieces of modern equipment.

NEW LABORATORY

Establishment of a new testing and research laboratory, to be staffed by the school faculty, is being completed. Research under the direction of Dean Hugh M. Brown has already been started.

Both practical and theoretical work will be carried on in the laboratory. Part of this work will be done independently by the school. Some of the work will be in conjunction with mills seeking solutions to specific problems.

New equipment for the laboratory includes a direct reading yarn balance, Taber abrasion tester, inclined plane strength tester, Suter-Webb duplex cotton fiber sorter, and pendulum type yarn strength testers. Some of this and other equipment has been furnished by Deering, Milliken and Co.

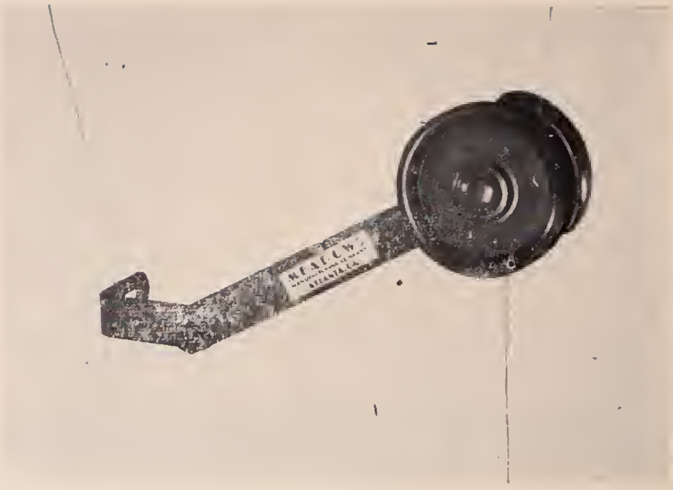
Research in the laboratory will not be limited in scope to any specific branch of textiles. Experiments are now being conducted in cooperation with the American Society of Testing Materials on a new type of grab test jaws. New equipment for testing purposes, such as a new tensile strength testing machine of the pendulum type that is practically free of inertia, is being constructed in the laboratory, and tests as to its practicability are being carried out. A search is underway for a new and improved method of sorting fibers, to replace the tedious, time-consuming hand sorting method. Tests on new improvements for looms will soon be carried out by members of the faculty and students of advanced standing.

The school's laboratory is planning to conduct experimental work on various projects for the Quartermaster Corps. For example, a study of a plasticized cellulose acetate yarn is under consideration.

Cooperation with industry will definitely increase as facilities for giving assistance are expanded. The school has in the past and will continue in the future to work with the South Carolina branch of the Southern Textile Asso-

(*See page* 21)

The Meadows Four Spindle Band Drive



By H. R. VALERIUS

The textile industry is experiencing an acute shortage of new machinery at the present time. There have been, however, developments which will improve the textile machinery now in use. The Meadows four spindle band drive has been found to improve the existing band driven spinning frames.

This spinning frame drive has been installed on a 1925 Model C Whitin spinning frame by the members of Professor Gaston Gage's cotton spinning class of the Clemson Textile School, and the improvements have been noted.

With this drive, it is possible to get practically the same end results obtained from a four spindle tape drive. Assuming that the band drive whorls are uniform, the Meadows band drive gives the same uniform spindle speed as the four spindle tape drive. This uniformity of spindle speed is necessary in maintaining the desired twist per inch.

In addition to maintaining the uniform spindle speed, the Meadows drive eliminates a great deal of friction found where the bands are applied under too much tension by applying the proper amount of tension to the bands through tension pulleys. It has been found that, in starting up band driven spindles after hours of inoperation, the Meadows four spindle band drives will start up with no excessive bands off. The reason for this is apparent since the tension pulleys compensate for any drawing up of the bands due to idleness, or to excessive moisture in the atmosphere.

The tension pulleys used in connection with the Meadows drives are pressed steel, grooved, ball-bearing pulleys. This type of pulley will use a minimum amount of power. Lubrication is required only after five thousand hours, which is about the normal overhauling period for the spinning frame. To apply the Meadows drive to an existing band driven frame, it is not necessary to remove the bog bins, spindles, cylinder or any other part. The pulley is applied to the lower rail, not the spindle rail, by drilling one 5/16 inch hole into the lower rail, and by fastening the pulley bracket with a 5/16 by one inch machine bolt.

The band used has a loop in both ends. The loops are waxed, and the ends are put together with a bronze hook. This, together with the function of the tension pulley, eliminates the use of a banding device or by varying tension on the spindles when the bands are tied by hand.

In summary, the advantages derived from use of the Meadows four spindle band drive are a constant spindle speed which eliminates soft yarns due to band slippage, a reduction of friction on the spindle bolsters, the elimination of wet weather band trouble, and more spindles in production because the four spindle bands will run much longer than the conventional type bands.

CIRCULATION

We desire to maintain our free mailing list as up-to-date and as accurate as possible. Also we would like for all of Clemson's textile graduates to receive future copies of THE BOBBIN AND BEAKER.

You are urged to keep us informed of changes in your mailing address, and to send us the names and addresses of those who wish to be added to our permanent mailing list.

Address: Circulation Manager, THE BOBBIN AND BEAKER, Clemson College, Clemson, S. C.

JUNIOR STAFF

The May issue of THE BOBBIN AND BEAKER will be edited by a staff composed of members of the Junior Class. This staff will be named in the March issue.

More Juniors are needed to work with the Juniors who are already on the staff. They are urged to come out as soon as possible.

Textile Deans Meet

The National Council of Textile School Deans held its fall meeting at the Bellevue-Stratford Hotel in Philadelphia, October 23, 1946, and pledged its full support of the Federal Research on Cotton.

The Philadelphia Textile Institute sponsored the conference. Dean Malcolm E. Campbell of the North Carolina State College School of Textiles presided.

Placement problems of textile schools were discussed, and it was revealed that the textile industries present demand for trained manpower from the schools is approximately fifteen times above the number of graduates available. It is estimated that it may require five years before the educational end can fulfill the requirements of the industry.

Two hundred fifty students are expected to graduate this year from the ten textile schools in the country. This number is slightly less than ten per cent of the overall enrollment of 2,700 students. At least 3,500 "qualified" applicants had to be turned away from the nation's textile schools. It was also disclosed that between 75 and 80 per cent of the incoming freshman classes are veterans.

The Council brought out the fact that one of the greatest hindrances to the educators is the acute shortage of machinery that now exists.

Much of the discussion at the meeting was devoted to the cotton research plan of the Government, and the textile school representatives indicated a willingness to undertake some of the work of the project through contractual research. Under the enabling bill, or Public Law 773 which is often referred to as the enabling bill, a fund has been set up for agricultural research, of which a part will be devoted to cotton. The National Council is now on record as making available for the cotton study the facilities of their institutions.

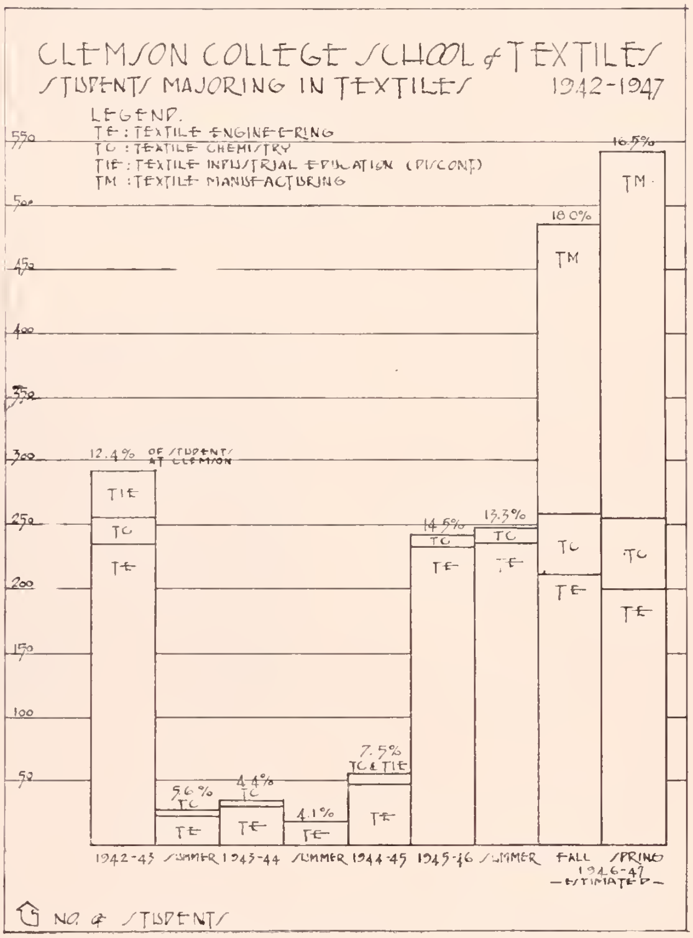
At the meeting, members of the Council adopted an important resolution, calling for "participation with the textile division of the American Society of Mechanical Engineers in bringing about closer cooperation between the textile industry and the textile colleges in order to advance and make more useful the general textile educational system."

Dr. Hugh M. Brown, Dean of the Clemson College Textile School, attended the meeting. Other textile institutions' representatives include Dean Campbell; Leslie B. Coombs, Principal of Bradford Durfee Textile Institute; Richard I. Cox, Dean of the Philadelphia Textile Institute; Herman A. Dickert, A. French Textile School, Georgia Institute of Technology; William D. Fales, Head of the Textile School, Rhode Island School of Design; Kenneth R. Fox, President of Lowell Textile Institute; E. E. Parsons, Head of the Department of Textile Engineering, Texas Technological College; and George Walker, Principal of New Bedford Textile School.

Enrollment

An all-time enrollment high in Clemson's Textile School was established in September 1946 when 492 students registered for classes in the three courses offered by the school. These men represent approximately eighteen per cent of all students enrolled in the nation's textile schools.

Some of the effects of World War II on enrollment in the textile school can be seen in the graph above. The full force of the demands for men for the armed services did not strike until the close of the 1942-43 session, when enrollment skidded more than ninety per cent.



The school's pre-war record enrollment, not shown in the graph, was in 1941-42, when 350 students were majoring in textiles and when Clemson's Textile School enrollment of day students exceeded that of all other textile schools in the country. Presently, the school is second in the nation in this respect, exceeded only by North Carolina State College Textile School.

Percentages shown in the graph represent the per cent of all students at Clemson enrolled in textile courses. Distribution of textile students among the several courses is also shown.

Of the 492 students at the present time. there are 183 freshman, 155 sophomores, 84 juniors, 65 seniors, and five special students. It is interesting to note that there were no seniors in the textile school during 1943-44.

New Professors

By R. F. SHERIFF

The Textile School of Clemson College extends a hearty welcome to the six new members of the faculty announced by Dean Hugh M. Brown at the beginning of the fall semester. Three of these men are recent graduates of the Clemson Textile School and are well known by those who were here before the war. A fourth is a Clemson graduate of ten years ago.

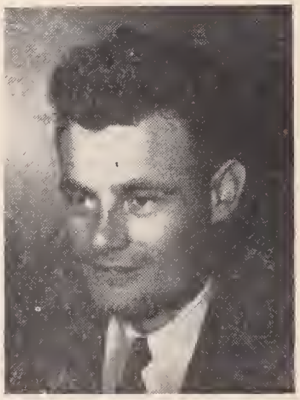
The school is also pleased to have back Professor William E. Tarrant, Jr., and Professor John V. Walters, who have recently returned from military leave.

ARVID CZARNITZKI

Professor Czarnitzki received his A. B. degree in science from Newberry College in 1923, and his M. S. degree in Chemistry from the University of South Carolina in 1936. Professor Czarnitzki was associated with the Columbia city schools for sixteen years, teaching in various schools of that system. During the three years prior to his coming to Clemson, he was with the Tire Cord Division of the American Viscose Corporation in Front Royal, Virginia. He held several positions while with this company; his work included the direction of training and supervision of junior chemists.

Professor Czarnitzki now serves as Assistant Professor of Textile Chemistry and Dyeing.

JOHN S. GRAHAM



Professor Graham, who now holds the position of Instructor in Research and Testing, received his B. S. degree in Textile Engineering from Clemson College in 1943. During the three years following his graduation, Professor Graham held a position with the United States Department of Agriculture in its cotton testing laboratory at Clemson.

Professor Graham was appointed to the faculty of the textile school in July 1946. In addition to his duties as an instructor, he also assists in the textile school's research laboratory.

LACONLA H. HANCE

Professor Hance, member of the class of 1944, received his B. S. degree in Textile Engineering from Clemson in 1946. He immediately accepted an appointment to the faculty of the textile school as Instructor in Weaving and Designing.

While at Clemson, Professor Hance was a staff writer for THE BOBBIN AND BEAKER. He was also a member of the "Y" Cabinet and the glee club. He is a member of *Phi Psi*, Phi Kappa Phi, Tiger Brotherhood, Strawberry Leaf, Phi Eta Sigma, and Alpha Phi Omega.

Prior to his return to Clemson for graduation, Professor Hance served in the United States Army. He saw active duty in the European Theater of Opreations and was discharged as a Captain in the Infantry.

MORRIS D. MOORE, JR.

Professor Moore, or "Doc" as he is better known by his many friends on the campus, received his B. S. degree from Clemson in 1943 with a double major in Textile Engineering and Textile Industrial Education. In his senior year, he was listed in Who's Who Among Students in American Universities and Colleges. He is a member of Phi Psi and was Editor-in-Chief of THE BOBBIN AND BEAKER in 1942-43. He is now faculty adviser of this publication.

Immediately after graduation, Prof. Moore entered the army, where he saw service in the European Theater of Operations. While in England, he attended Shrivenham American University, located near London. There he studied education under Sir Fred Clarke, outstanding English educator. He was discharged in 1946 as a First Lieutenant.

Professor Moore joined the faculty of the textile school in July 1946 as Instructor in Textiles.

(*See Page* 22)

Plant Safety Discussed at Recent Meeting

By A. M. HAND

NOTE: *We are aware that the material herewith has been highly publicized in textile magazines throughout the nation, but due to the fact that few students subscribe to these magazines, we are printing for their benefit the highlights of this meeting.—The Editor.*

The fall meeting of the Southern Textile Association's South Carolina Division was held in the Clemson College textile school building on October 5, 1946. Represented at this meeting were two hundred or more operating executives, including approximately thirty officials in charge of safety and personnel work. The entire meeting was for the study and discussion of plant safety programs.

J. B. Templeton, superintendent of the Brandon Corporation's Poinsett Mill at Greenville, S. C. presided. He was assisted during the first half of the meeting by J. L. Adams, superintendent of Beaumont Manufacturing Co. at Spartanburg, S. C., and during the second half by Newton G. Hardie, general manager of the Laurens (S. C.) Cotton Mills.

Papers read during the course of the meeting include the following: 1. Accident Frequency as Related to the Accident Problem, by C. A. Anderson, District Claims Manager, American Mutual Liability Insurance Co., Greenville, S. C.; 2. Systematic Records and Following up in Accident Prevention Work, by A. C. Phelps, Personnel Director of Brandon Corporation, Greenville, S. C.; 3. An Efficient Accident Prevention Program, by J. D. Green, Plant Manager, Springs Cotton Mills, Chester, S. C.; 4. The Value of Pre-employment Physical Examinations—I, by W. M. Pittendreigh, Superintendent of Laurens (S. C.) Cotton Mills; 5. The Value of Pre-employment Physical Examinations—II, by Sible Chaney, R. N., Plant Nurse, Laurens (S. C.) Cotton Mills.

Mr. A. C. Phelps, in describing the Accident Prevention System of Brandon Corporation, outlined briefly the procedure used in establishing this system: first, stressing to the supervisory personnel the importance of preventive measures; second, examining and systematically recording the knowledge and experience of others. This system proving capable of reducing accidents, its bases are outlined briefly as follows:

1. "Accidents are caused—they don't just happen.

2. Eighty-eight per cent of the accidents are caused by human factors, twelve per cent by mechanical factors, mainly. About two per cent are unavoidable by the use of ordinary precautions.

3. The same cause that produces a relatively minor injury, such as a broken finger nail, may also result in such major injury as amputation of a finger, hand or arm, or even death.

4. Prompt and efficient first aid is absolutely necessary to prevent infections with their train of lost time and permanent injury.

5. Certain safety rules are necessary for control of personnel causative factors.

6. Decrease in accidents is invariably accompanied by increase in quantity and quality of production and, therefore, by decreased cost of production in addition to decreased cost of accidents themselves.

7. The best way to engender safety consciousness in employees is to show them by positive action that you intend to remedy dangerous conditions immediately as they are reported.

8. Persons failing to observe ordinary precautions or safety rules in their work should not be reprimanded in such fashion as to engender resentment, but should be sold upon the value of safe working habits to themselves, their families, and other workers; but such persons as resist unduly this process simply have no place in the organization.

9. Some persons are naturally accident-prone, by reason of lack of judgment or physical factors or bad living habits. These must be eliminated.

10. Accident prevention is definitely an every-minute part of production, and as such is the natural responsibility of each supervisory person.

11. The time to investigate any accident is as soon as possible after it occurs, before recollections have a chance to change.

12. While efficient production is the end of any industrial organization, safety in production *must* be its policy if operations are to continue successfully over long periods of time.

13. The pronouncement of policy in safety is a function of top management, and final responsibility for each and every injury rests upon the same.

14. Supervisors are entitled to systematic and accurate records and analyses of the same from the staff organization as an aid to production and accident prevention, enabling them to spot bad conditions or bad work habits with minimum time and effort on their part.

15. The most efficient way to conduct any operation is invariably the safest way. Therefore study of processes or operations by the staff is necessary, in conjunction with the supervisor, so as to further efficient and safe production."

This system speaks for itself as the cost after the system was put into effect dropped from $2.94 per thousand man-hours for the year 1943-1944 to $2.30 to date.

PHI PSI

CHAPTER REORGANIZES

Iota Chapter of *Phi Psi,* national honorary textile fraternity and oldest on the Clemson campus, having been chartered in 1927, has once again assumed its important position among campus organizations and in the lives of textile students. For three years during the war, the number of active members was reduced to such a point that activities on a chapter scale had to be abandoned. Last spring, when enrollment in the textile school increased from 54 to 244, three veterans, F. J. Hawkins, J. R. Hunter, and E. T. McIlwain, undertook to reorganize the chapter.

After due initiative measures had been administered, nine new members were admitted in April, 1946. They were J. B. Lowman, W. B. Greyard, Jr., W. O. Ruddock, J. R. Clark, Jr., A. K. Wood, W. E. Broadwell, W, D. Clark, Jr., J. C. Simmons, and D. W. Walker. Their formal initiation was concluded in the presence of Harold C. Wood, Grand Council President, and Harold H. Hart, one of the five Philadelphia Textile School students who founded *Phi Psi* on March 18, 1903, and now Grand Executive Secretary, at the third degree rites. Mr. Hart gave a talk on the accomplishments and history of the fraternity.

The annual chapter banquet was held in Greenville a short time later. Professor Robert K. Eaton gave an interesting talk to the group, which included many *Phi Psi* alumni members from Greenville and vicinity and a number of professors. In his address, Professor Eaton outlined the projects he considered most important for *Phi Psi* to undertake during the coming years. One of these was the reorganization of THE BOBBIN AND BEAKER.

During the course of the banquet, E. T. McIlwain was elected President for the current school year. He succeeded F. J. Hawkins, who was graduated during the summer. Other officers chosen were W. D. "Chip" Clark, Vice-President, J. R. Clark, Secretary-Treasurer, W. B. Greyard, Senior Warden, and W. E. Broadwell, Junior Warden.

During the summer of 1946, six more initiates were taken into the chapter. They were N. S. Anderson, T. E. Christenberry, R. E. Chandler, N. E. Garvin, W. M. Greer, and A. E. Williams. Shortly after the third degree, a turkey supper was given for these new members and for faculty members and their wives.

The chapter reached pre-war strength in the fall, with the return to school of several old members and the initiation of eleven new members in November. These new members were J. C. Austell, R. E. Christenberry, R. R. Crowther, L. S. Croxton, M. D. Heaton, L. F. McMakin, G. P. Robinson, H. R. Valerius, J. F. Webster, W, C. Whitten, and R. B. Willey.

Twenty-five of the 26 new members taken in since the war are veterans.

Another group of initiates will be admitted prior to the annual banquet this spring.

THE BOBBIN AND BEAKER

Although THE BOBBIN AND BEAKER is a publication of the textile students, much credit is due Iota Chapter of *Phi Psi* for making possible this and succeeding issues. Largely through the efforts of E. T. McIlwain, President of the chapter, and Professor M. D. "Doc" Moore, Jr., *Phi Psi* alumnus and Editor of THE BOBBIN AND BEAKER in 1942-43, is publication resumed.

Phi Psi earnestly trusts that the necessity of discontinuing publication will not arise in the future. Rather it hopes that THE BOBBIN AND BEAKER will continue to advance and expand in whatever direction its readers desire.

Although a fall issue had been contemplated when reorganization was being effected, we are glad that a start has now been made, and we, too, believe that it's better late than not at all.

Phi Psi will continue to cooperate with THE BOBBIN AND BEAKER, and the incentive of its members will always be available to it.

WHO'S WHO

Four members of the chapter have recently received the honor of being chosen for Who's Who Among Students in American Universities and Colleges for 1946-47. Among the twenty-three students at Clemson receiving this coveted recognition are W. B. Greyard, E. T. McIlwain, W. D. "Chip" Clark, and L. F. Tigler.

Phi Psi has always been well represented in other important activities on the campus. We of *Phi Psi* are proud of the achievements of the members listed above.

SPECIAL TRIBUTE

Although this issue is dedicated to all textile students and graduates who gave their lives during the war, *Phi Psi* wishes to pay special tribute to those who were members of Iota Chapter. The *Phi Psi* service flag, which was dedicated in 1943, now has eight gold stars among the other 117 blue stars.

Phi Psi is proud indeed of these Brothers who made the supreme sacrifice: Lt. William H. Carson, TE '42; Clifford J. Gormley, TC '39; 1st. Lt. John R. C. Griffin, Textiles '42; Lt. Henry T. Hahn, TE '43; Capt. Henry D.

Leitner, TE '37; John D. McArthur, Jr., TC '40-43; 1st. Lt. Richard T. Osteen, Jr., TC '41; and Capt. DeWitt J. Ross, TE '41.

Phi Psi sent forth 115 men into active service, and we are proud of the enviable record made by each and every one of them.

The chapter service flag is displayed in the chapter room and is accompanied by a list of *Phi Psi* men who have served or are still serving their country.

The fraternity is hoping to obtain a plaque in memory of all textile students who gave their lives in World War II. This plague, to be placed in an appropriate place in the Textile Building, would be inscribed with the names of all these men.

ATTENTION FRESHMAN

It is evident that most underclassmen do not fully understand the purpose of *Phi Psi*. Nor are they aware of requirements for membership.

Often sophomores and juniors approach members, asking for the same information that should have been presented to entering freshman.

Freshman are in a most advantageous position to compile a grade point ratio high enough for admission during later years. Since ratios are inclined to fall rather than rise from year to year, freshman would do well to concentrate their efforts on the making of good grades.

Although emphasis is placed on scholarship, it must not be assumed that grades alone constitute the entrance requirements. Character, personality, and those intangible qualities of gentlemanliness are all important qualifications for *Phi Psi* men to possess.

Phi Psi is not only the largest and most respected textile fraternity, but it is an active one, with alumni chapters located in key cities throughout the textile sections of the country. Membership is not just until graduation; it is for a lifetime. The benefits which belong to the man who can say, "I am a member of *Phi Psi*" cannot be overestimated.

Freshmen should begin now to consider what *Phi Psi* membership can mean to them. If they will start now, then they, like others before them, will be in position to join in the near future.

ALUMNI NEWS

In this space each time, the chapter would like to include news of our alumni who are now making their way in the textile world. They must be reminded that active membership does not cease with graduation, but rather that membership should become more active when actually associating with the textile industry.

We are anxious to learn of their activities and achievements since leaving school; we are especially concerned about those now returning from the service to civilian life.

We hope, too, that they will wish to continue their relationship with the fraternity and with the textile school. To a large degree, it will be *their* support that will make for a better school here at Clemson.

ALUMNI REUNITE

A buffet supper, which turned out to be a lively reunion of old grads, faculty members, and active chapter members, was given in honor of *Phi Psi* alumni immediately after Clemson's gridiron victory during the annual Homecoming festivities. Good food and old talk were the order of the day for some fifty guests at the supper held in the chapter room.

In addition to a number of professors, students, friends and wives, there were present alumni Charles R. Howard, President of *Phi Psi* in 1942-43, and wife, North Augusta, S. C.; Ralph P. Sullivan, Slater, S. C.; Lewis A. Walters, Spartanburg, S. C.; L. C. Harmon, Jr., Concord, N, C.; Hugh Jameson and wife, Abbeville, S. C.; and Dwight "Sunshine" Allen, Langley, S. C.

It is hoped that the success of the 1946 "reunion" will enable the chapter to make the function an annual affair.

GRADS ON FACULTY

Phi Psi is happy to announce the return of two outstanding members of the chapter, M. D. Moore, Jr., and L. H. Hance, as instructors in the School of Textiles. Both are veterans of World War II.

Prof. Moore, who now holds the position of Instructor in Textiles, is a Textile Engineering and Textile Industrial Education graduate of 1943. He served as Junior Warden of the chapter in 1942-43 and as Editor-in-Chief of THE BOBBIN AND BEAKER. As Faculty Advisor at the present time, his expert advice and suggestions have furnished the spark that has brought this issue through the formative stages to this, the published state.

Prof. Hance, who is so ably serving as Instructor in Weaving and Designing, was a member of the Class of 1944. He was Secretary-Treasurer of the chapter in 1942-43, before leaving for active duty. He returned to Clemson in 1946, graduating in Textile Engineering last September. He was immediately added to the school faculty. Prof. Hance was also on the staff of THE BOBBIN AND BEAKER.

The Editor's Page

BACK TO PRESS

With a three-fold purpose in view, THE BOBBIN AND BEAKER once more goes to press. Not since April 1943 have the students of the Clemson Textile School collaborated to edit THE BOBBIN AND BEAKER. Now that World War II is a fading memory, and with enrollment in the textile school at an all-time high, we feel that once again this journal can take its rightful place in the small circle of textile student publications.

THE BOBBIN AND BEAKER, post-war model, will make no immediate material changes. Rather, it will adhere to the policy formed heretofore. In so doing, it purports (1) to present to the mill executive, plant manager and superintendent, to alumni and studens of the school, and to others with an interest in the field of textiles, information which may prove beneficial to the professon; (2) to serve as a means of introduction to the Clemson Textile School, and to acquaint others with its activities and accomplishments; and (3) to provide for textile students experience in writing, editing, and, in general, performing the thousand and one tasks which must necessarily be done in putting out such a journal. We are convinced that it is impossible to attempt more at the present time.

There is for us no mehod of evaluatig the results of the aims above. So, to you, our readers, we turn, trusting that you will judge our efforts for us—so that we might know if we have in some way accomplished our goals. Your suggestions, your criticisms—your knowing appraisal—will serve markedly in determining the path of future issues. Only in such a way do we feel it possible for us to do our share in helping to close the steadily narrowing gap between the industry and the textile schools.

We shall endeavor to publish two more issues before the close of the school year, one issue in March, the other in May. Next year and in the years to come, there will probably be four issues during each school year. Reorganizational difficulties made that impossible this year.

As in previous years, the practice of sending out THE BOBBIN AND BEAKER free of charge will be continued.

Since much time has elapsed since the last issue, and since so many changes have taken place within the school, this issue is devoted largely to acquainting the public with the school. Some phases of activity not covered in this issue will be included in future issues.

Future issues will be devoted to a much greater extent to reporting information of a more technical nature. This may consequently result in less student participation since, in such articles, college theory must be greatly supplemented by the actual mill experience.

The discontinuance of publication in 1943 naturally resulted in a loss of valuable experience. This loss is plainly evident at the present time. We trust, therefore, that THE BOBBIN AND BEAKER is now commencing a long periof of uninterrupted publication.

—W. E. B.

ACKNOWLEDGEMENTS

We gratefully acknowledge the assistance and cooperation given us for this first issue. We are most grateful to Dr. Cloudius T. Murchison for his guest editorial, and to Dr. James E. Ward for his article, "Operation Dixie."

We appreciate the cooperation of Mr. John T. Wigington, Director of the Division of Technical Service of the Cotton-Textile Institute, Inc., who has long given his whole-hearted support to THE ROBBIN AND BEAKER.

We thank Prof. M. T. "Doc" Moore, Editor-in-Chief of this journal in 1942-43, who, as our Faculty Adviser, has given much of his time, experience and suggestions to help make this issue possible.

We are indebted to Dean Hugh M. Brown for his kind support and assistance.

We owe special thanks to Iota Chapter of *Phi Psi*, which founded THE BOBBIN AND BEAKER in 1939 and which was responsible for our reorganization late last year.

Our thanks, too, are due the professors of the textile school, and the small group of students who have given their all for THE BOBBIN AND BEAKER.

Finally, but not least, we thank our advertisers, without whom we could never have gone to press.

—W. E. B.

YOUR HELP

Thus far response to pleas for assistance and suggestions has been most gratifying. A continuation of this cooperation will be needed in the future if success is to be ours.

We are anxious to establish a "Letters to the Editor" section and a column devoted to the activities of our graduates now working in the industry. Your assistance will be necessary if either of these hopes is to materializ. Also, we urge the contribution of material which is suitable for publication.

To those of you who do not call yourselves writers, we heartily recommend at least a part-time journalism career.

LOOKING BACK

(*Continued from page* 12)

ment, headed by Professor Robert K. Eaton; the Weaving and Designing Department, headed by Professor Arthur E. McKenna; and the Textile Chemistry and Dyeing Department, headed by Professor Joseph Lindsay, Jr.

The school has an active chapter of *Phi Psi*, national honorary textile fraternity. Iota Chapter was chartered in May 1927; and one of the chapter's charter members, Prof. Dan P. Thomson, presently serves the school as Assistant Professor of Carding and Spinning.

THE BOBBIN AND BEAKER was organized in November 1939. The first issue appeared in March 1940.

It is impossible to enumerate the individual achievements of members of the faculty and of the more than nine hundred graduates, most of whom are now active in the textile field.

LOOKING AHEAD

(*Continued from page* 13)

ciation. Problems from surrounding mills are constantly referred to faculty members for their expert advice and opinions.

Dean Brown and others of the faculty have shown such interest in physical research, which the new laboratory will accommodate, that accomplishments of great importance to the textile industry are expected as a result of their work.

Under the direction of Professor Joseph Lindsey, Jr., research in the dyeing and finishing of cotton and the newer fibers will be extended as equipment becomes available.

CURRICULA CHANGES

Introduction of a new Textile Engineering course, for the first time providing for the necessary amount of engineering work, was made last September together with other important changes in the textile school's curricula The new Textile Engineering course provides for thorough training in both textile and engineering principles and practice, with engineering emphasis being placed on machine design, mechanism, metal processes, direct and alternating current circuits and machinery, static, kinetics, and heat power.

With the necessary modifications, the former Textile Engineering major has been renamed Textile Manufacturing. In this course, additional stress will be laid on textile management, particularly on textile costing, time study, and physical textile testing. Only slight changes in the course in Textile Chemistry have been affected. The course in Textile Industrial Education has been discontinued.

By far, the most noticeable changes in courses offered by the school are in the Textile Management Department. Courses in costing and time study have been greatly extended. Physical textile testing has been strengthened and combined with the course in microscopy. These and other curricula changes, which were made throughout the college at the same time, will affect all students who have completed not more than three semesters at Clemson. However, all other students may elect to pursue one of the new curricula in lieu of the old.

The possibility of offering graduate degrees in the Textile School in the near future is by no means remote. When the staff and facilities are available for the necessary work, a graduate school will be instituted. It is probably a matter of but a few years before such work will be well underway. Other schools on the campus are in a similar position.

Already the school's enrollment has reached a new peak, with 492 students registering for textile courses last September, making the school second in the nation in this respect. The new high tops by almost a hundred and fifty the previous record enrollment of 353 students in 1941. A breakdown of the students by classes show 183 freshman, 155 sophomores, 84 juniors, 65 seniors and 5 special students. By courses, there are 214 students enrolled in Textile Engineering, 128 in Textile Manufacturing, 45 in Textile Chemistry and 5 special students. Enrollment for the February semester is expected to be even greater than at the present time.

Professor John S. Graham at work in the new textile school laboratory.

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NEW PROFESSORS

(*Continued from page* 16)

JAMES H. LANGSTON

Doctor Langston received his B.S. degree from Stephen F. Austin State College, located at Nacogdoeches, Texas, of which he is a native. He did his graduate work at the University of North Carolina, where he received his M.S. and Ph.D. degrees in Chemistry. While there he held a teaching fellowship in Chemistry.

Prior to his coming to Clemson, Dr. Langston was associated with the research laboratory of the Columbia Chemical Division of the Pittsburgh Plate Glass Company. While with this organization, he did research n the field of plastics.

Dr. Longston has served the school as Associate Professor of Textile Chemistry and Dyeing since SSeptember, 1946.

THOMAS A. HENDRICKS

Professor Hendricks received his B.S. degree in Textile Engineering from Clemson in 1937. Upon graduation, he became associated with the Goodyear Mills for which he worked three years. He next accepted a position with the Alice Manufacturing Company.

During the war, Professor Hendricks was a textile inspector for the United States Government. In July 1946, he accepted an appointment to the facully of he textile school as Instructor in Textiles.

Thomas A. Hendricks

James H. Langston

"OPERATION DIXIE"

(*Continued from page* 7)

last May. Incidentally, the major objective in this Southern drive, other than an increased membership, is "to encourage and bring to public attention" a policy calling for voluntary arbitration in labor-management disputes.

The CIO, too, has its "Operation Dixie". Their objective is a million new members and a "fair to medium conquest of public opinion". This union has 350 organizers in South Carolina, Georgia and Alabama who are not only born and bred Southerners, but 95 per cent of them are veterans. Neither of these facts just happened. A million dollars will be spent in their campaign with another million available if needed.

The CIO does not claim as large a Southern membership as the AFL. At present the CIO puts its number in the South around 300,000, virtually all of whom are in manufacturing industries.

With eighty per cent of the textile industry in the South, the CIO's first objective is this industry. At present it is a prosperous industry and seems to be headed for several years more of prosperity. Good times, contrary to popular opinion, are the times which are most advantageous to the spread of union membership.

The Textile Workers Union of America (CIO) will be the union to work the textile field. It has 125,000 Southern members with a potential membership of 625,000. This is an efficiently organized union and is headed by one of the ablest unionists in the United States, Emil Rieve, who is a practical right-of-the-roader. There is nothing communistic or even "pink" about this union. Written into the constitution of the TWUA is a provision that no member of the communist party or of Communist, Nazi or Fascist organizations can hold office in locals or subordinate organizations.

The textile field is virtually unorganized. Long a low wage industry, most of the mills, organized as well as unorganized, now pay 65 cents minimum hourly rates. As an eighty per cent unorganized field, it represents one of the last open shop areas in mass production. In January 1937, average straight time rates were 36.9 cents in the

(*See page* 24)

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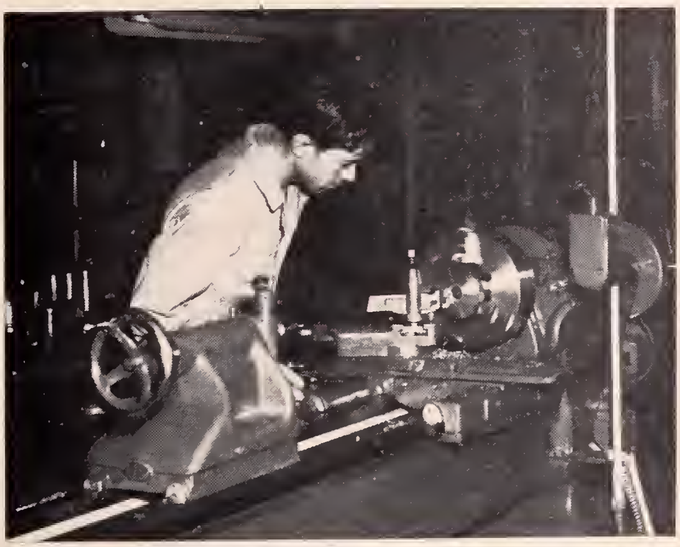
(Continued from page 6)



James Mauldin works at a lathe in the machine shop of the Deering Milliken Research Trust.

only places where new discoveries and improvements are being made. Important facts are learned in the mills themselves.

FIBER ANALYSIS

(Continued from page 8)

more adaptable to this type of work. One reason for this may be attributed to the fact that women, in general, surpass men at jobs which require precision work and which call for fine hand dexterity. Thorough knowledge and infinite care are required for this work.

Trainees become proficient with the Fibrograph used for determining fiber length and the Suter-Webb duplex fiber sorter for computing fiber length and length distribution and uniformity. The fibers are weighed after a fiber length array has been made, and the fiber fineness is obtained.

Microscopic tests are used in determining the relative thickness of the fiber cell walls for calculating fiber maturity. Thick-walled fibers indicate a high degree of maturity. Mature cottons tend to produce smoother yarns with fewer neps.

Tensile strength of fibers is determined by using the Pressley flat bundle method. Average cotton breaks between 78,000 and 82,000 pounds per square inch. The Pressley method is used in preference to the Chandler round bundle strength method, which is described by the American Society for Testing Materials.

Specific cotton fiber testing shows that in one case where three different samples of cotton each called 1 and 1/32 inches in staple length by the cotton classer, were examined in the laboratory and spinning tests were made, the samples gave the following results: the Oklahoma sample produced yarn strengths normally found in cottons with a staple length of 15/16 inch. The Carolina sample produced yarn strengths equivalent to those observed for cottons of 31-32 inch. The Brazos Valley (Texas) sample gave yarn strengths equal to cottons of 1 and 3/32 inches in staple length. These results clearly show the importance of knowing more of the qualities of cotton than the grade and staple length.

Precautions taken in the laboratory to insure accurate results include the following: (1) identification of the cotton samples, (2) proper selection of the sample so that results will be representative of the cottons tested, (3) checking the relative humidity (65% plus or minus 2% must be employed for all tests), and (4) checking all testing equipment for perfect operation.

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"OPERATION DIXIE"

(*Continued from page* 22)

South. These same rates were 67.1 cents in December 1945, and had reached even higher levels a year later.

Whether the South becomes more unionized depends upon a number of factors. The NLRA, commonly known as the Wagner Act, holds an important key. Without it, the present campaigns of both the AFL and CIO would face an almost impossible task. An early postwar relapse might also mean defeat.

There is a more important matter than that, as to whether these union drives are successful or not. One thing that the union representative and the industry man whose responsibility is labor relations sometime lose sight of as they concentrate on immediate and practical issues is the larger problem created by their conflicting attitudes. This problem is that there is real power at stake. The essence of power in peacetime reduces itself to control over the opportunity to work and earn a livelihood. It is almost literally control of life and death.

Such power carries with it grave responsibility not only to the ones directly affected, but also to the public as well. Unless management and labor settle down and start utilizing this power which is theirs to go forward together in the same direction, the general public is going to insist upon the right to wield the power and to decide the direction in which it shall go.

Should this shift come, it will not be the first time in history that the power has changed hands. The monarch lost it to the landlord and he, in turn, to the business man. Maybe the labor leaders can take it from the employers. Whether they can or not, this fact is evident: unless the power thus held is used wisely, another, and maybe the cycle will begin again with government, will take it over. These shifts come because this power can dominate the pattern of our political and economic life. This power should be wielded by management and labor together in a cooperative endeavor. Only then can either be sure of holding it. Industrial democracy and not the jungle law of the tooth and the fang would then reign.

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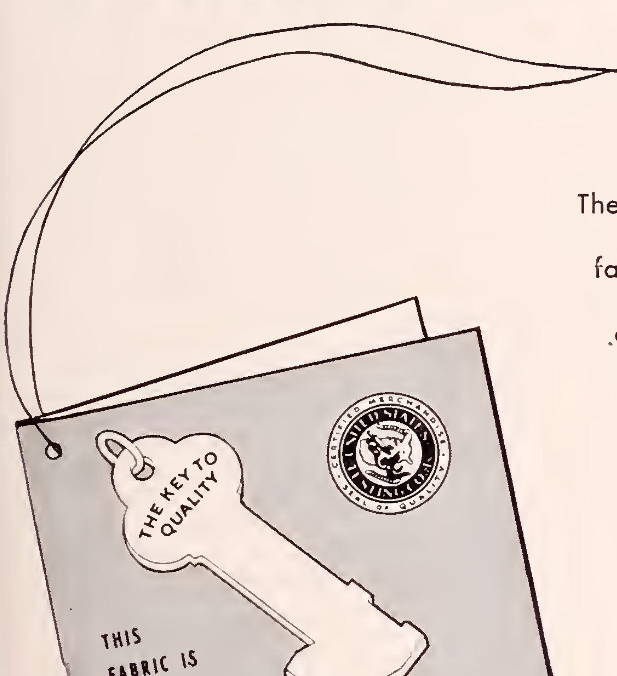

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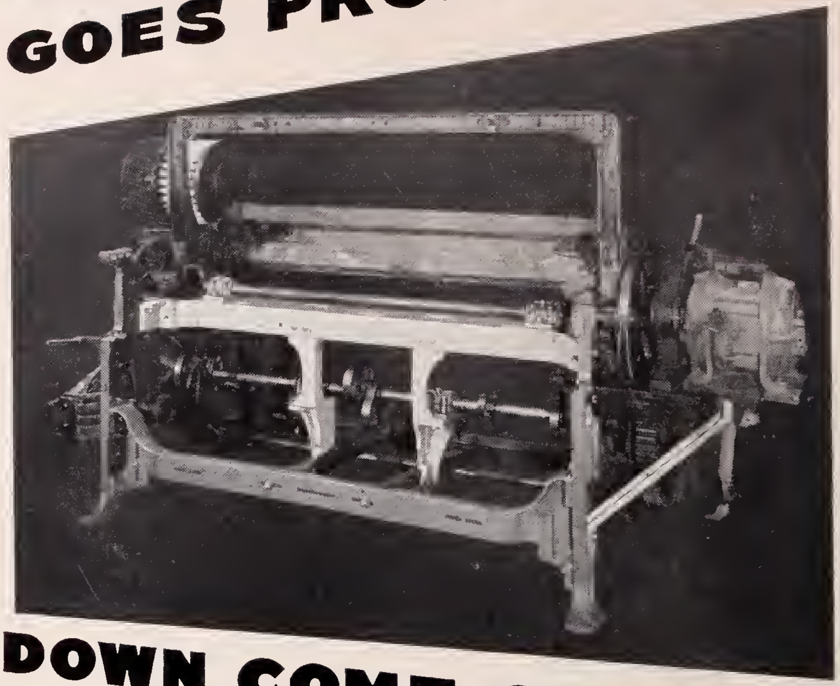

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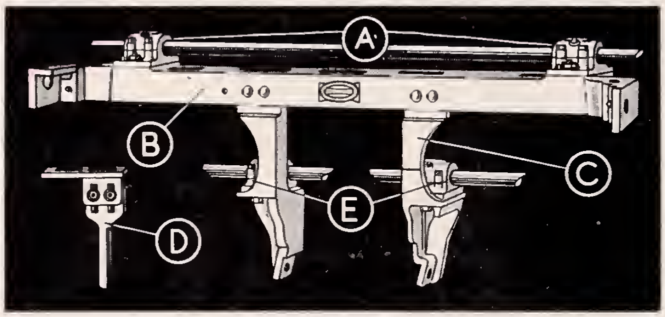

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BOBBIN & BEAKER

STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

OL. 5 MARCH, 1947 NO. 2

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ANTIQUE EQUIPMENT PRESENTED TO SCHOOL

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PROGRESS IN BLEACHING

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Official Student Publication
Clemson Textile School

Vol. V MARCH, 1947 No. 2

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The Bobbin and Beaker

Organized in November 1939 by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge three times during the school year by students of the Clemson College School of Textiles.

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Policy—

The views and opinions expressed in all guest articles are those of the writers themselves, and must not be construed to represent the views and opinions of the Editors of this magazine or of the Faculty of the Clemson College School of Textiles.

Comment—

We feel that the January issue has taken us "over the hump". This first issue in almost four years has been as much a challenge to us as it has been a job to be done. We hope that we have met the challenge. We realize the magnitude of the job yet to be done, but we feel that, with the continued support of all, it can be done.

The assistance given us already has in large measure made it possible for the resumption of publication. This help will be needed at all times if a creditable magazine is to be had. The staff appreciates fully the spirit of cooperation which has been shown by the faculty, friends, and advertisers.

Thus far the critics have been more than generous. Your valued comments on all matters are welcomed, and careful consideration of all criticisms and suggestions for improvement will be given. Largely through your suggestions, we will be able to correct our faults and to make both the necessary and desirable changes.

Adviser—

Professor Robert K. Eaton, Head of the Carding and Spinning Department, is now serving as Faculty Adviser. His able assistance and valuable suggestions have meant much to the staff in its preparation of material for this issue.

Professor Eaton succeeds M. D. Moore, Jr., who recently accepted a position in industry. The staff wishes him much success at his new post. His absence from the campus will be felt by all.

Circulation—

There are still many alumni who are not receiving their copies of *The Bobbin and Beaker.* We are anxious to have their names on the permanent mailing list. Also there have been many changes of address during the past few years. Please send your name and correct address to the Circulation Manager. Others desiring to receive the magazine may do so by addressing: Circulation Manager, *The Bobbin and Beaker,* Clemson College, Clemson, S. C.

RECENT GRADUATES

Nineteen students of the School of Textiles received the degree of Bachelor of Science in Textile Engineering at graduation exercises held in the College Chapel Sunday, February 9, 1947.

Dean Brown listed these graduates, with their home addresses and places of employment, where known, as follows:

James C. Austell, Jr., of Blacksburg, S. C., now with Burlington Mills, Burlington, N. C.; Joseph D. Blalock of Camden; John L. Brady of Spartanburg, now with Drayton Mills, Spartanburg; Thomas E. Christenberry, Jr., of Greenville, now with Victor Monaghan Mills, Greenville; Joseph W. Davis of Columbia; Walter M. Greer of Greenville, now with Texize, Inc., Greenville; Wilbur B. Greyard, Jr., of Greenville, now with Judson Mills, Greenville; Henry A. Josey of Anderson, now with Springs Cotton Mills, Lancaster; Charles M. Joye of Columbia; David C. Lee of Whitmire, now with Abbeville Mills, Abbeville, S. C.

Also William M. Littlejohn of Clemson, now with Abbeville Mills, Abbeville, S. C.; James B. McDonald of Bolton, Georgia; Carl F. Merritt of Piedmont; Joseph B. Rhame of Sumter, now with Dunean Mills, Greenville; Frank C. Rogers, Jr., of Spartanburg, now Instructor in Textiles, Clemson School of Textiles; Carl W. Sinclair of Greenville; Thomas A. Turner, Jr., of Pocahontas, Miss., now with Magnolia Cotton Mills, Magnolia, Ark.; David W. Walker of Anderson, now with the Central Industrial Engineering Group of the Deering Millikin chain; and William M. Washington of Honea Path, now with Watts Mills, Laurens, S. C.

Thomas E. Christenberry, Jr., Joseph W. Davis, Walter M. Greer, and David M. Walker were graduated with honor.

There were no graduates in the new curricula adopted by the school last fall, and there were no graduates in Textile Chemistry. The February graduating class was the largest mid-year class since pre-war days.

Clyde A. Murchison of Anderson has completed all of the work needed for graduation and will receive his degree in Textile Engineering in June. He is now with the Central Industrial Engineering Group of the Deering Milliken chain.

AATCC

Six seniors majoring in Textile Chemistry were admitted as student members of the American Association of Textile Chemists and Colorists early this year. They are L. Tigler, E. T. McIlwain, J. K. Waits, R. F. Sherriff, W. E. Broadwell, and D. A. Watson. They were sponsored by Professor Joseph Lindsay, Jr., Head of the Department of Textile Chemistry and Dyeing.

Several of the new members were present at the meeting of the Piedmont Section on January 25 at the Poinsett Hotel, Greenville, S. C.

Graduate Work Needed In Textiles

By *DR. ROBERT F. POOLE*
President, Clemson College

For a long time graduates of textile schools were accepted reluctantly in textile manufacturing plants. The situation was caused by various factors. In recent years the graduate of textile schools has made a place for himself in the industry. He has ably sold his services by achieving much in a role of progress. Perhaps his contributions have brought about a broader vision in the textile field. There are demands for chemists, economists, botanists with knowledge of fibers, and physicists who hold the doctor's degree. These demands for men of greater knowledge, a definitely meritorious value, mean that the graduate with a bachelor's degree must do about three more years of hard study if he wishes to reach the top in textile positions.

A large number of our brilliant and dynamic graduates shun the opportunities offered by graduate work and the necessary three years of intensive study do not appeal to them. They have not comprehended the importance of graduate work. Now that the demands are specific, as has long been the case for one preparing for medicine, it may be possible to interest young men who possess aptitudes, wisdom, and vision to make the necessary preparation which is requisite for top positions in the textile industry and its many allied fields.

The leadership in the textile industry is not mistaken in its needs. A well trained man is an asset to any organization and at any time may greatly improve the values of the industry. Executives are finding that many of the men who do seek advanced education not only possess more potential values than the graduate with only a bachelor's degree, but in employing such graduate he takes less chance than with those not interested in mastery of principles.

For fifty-three years, the life of Clemson College, an effort has been made to strengthen the courses leading to the bachelor's degree. That satisfactory goal has been reached in many curricula and the way is now clear for this same effort to advance into the larger fields of education offered by graduate work.

The complexities in the textile industry, involving the use of cotton cellulose, wood cellulose, flax, silk, wool, and synthetic fibers, make the field for textile education broad in its scope. More intimate knowledge of cotton cellulose, its blending qualities with fibers, ways of maintaining its strength, and the establishment of standard qualities is a vital matter that seems to be necessary for maintaining progressiveness in the cotton textile industry. It is inevitable that other fibers will replace cotton in many fabrics but well educated men who possess vision, intuition, and the "know how" may continue to do the things that will keep cotton cellulose at and above its present usefulness so that it may compete favorably with those other fibers that are encroaching on its uses of the past.

The problems of the textile industry start with the sowing of the seed in the soil and stop at the end of the durability of the manufactured product. High class products throughout the many processes and uses are what everybody wants. They cannot be had by wishful thinking and by the outmoded methods and processes of the past. Men must be educated to solve the problems all along the line. I believe a strong graduate program can occupy a large place in fulfilling the educational needs but the graduate school as such is worthless unless it can attract the graduates with the bachelor's degree who possess qualities of wisdom, vision, initiative, and at least a certain love of textiles.

In his Will, a document possessing great foresightedness, Mr. Clemson speaks of a "high seminary of learning" and the useful application of the sciences and arts. The language of the Will tends to convey a meaning which projects the need for close fellowship between college and industry to the end that both shall be richly rewarded. I can visualize now how the graduate program in the years ahead may easily take Clemson to the textile manufacturers and bring the textile manufacturers to Clemson because of similarity of interests, aims, and objectives.

How may one approach graduate work in the field of textiles? Since we are dealing with carbohydrates, proteins, and synthetic chemicals, and since solving the prob-

(*See page* 17)

Human Engineering

By M. D. HEATON

I have heard a number of men, approaching that glad day of graduation from Clemson say, "I've never even been inside of a mill and I wonder just how I will like the mill." No one can tell a man whether he will be happy and successful in his work in the mill or not, because of the many factors involved. However, I would like to discuss one of these factors which will have great bearing on the subject. This factor is the thing called "human relationship" or "human engineering".

In college we study a little sociology, history, literature, and so on, which have some connection with this subject, but this article is an attempt to deal with what will be called "getting along with people", leadership, personality, and other terms, out in the mill. Many mill men consider this to be the most important part of the requirements for a successful career in textiles.

When a man undertakes a job for the first time, he is going to be on trial from all sides. The workers and management alike will be sizing him up and forming opinions about him. The new man is in the spotlight as much as the bride at her wedding, and, unless he is a self-confident sort of person, will be just about as nervous. It will probably help him to know that they will not expect him to be a superman and more than likely will not expect as much from him as he will from himself. The more interest the new man has in his job, the less time he will have to worry about the impression he is making. As a result he will probably be less likely to feel conspicuous.

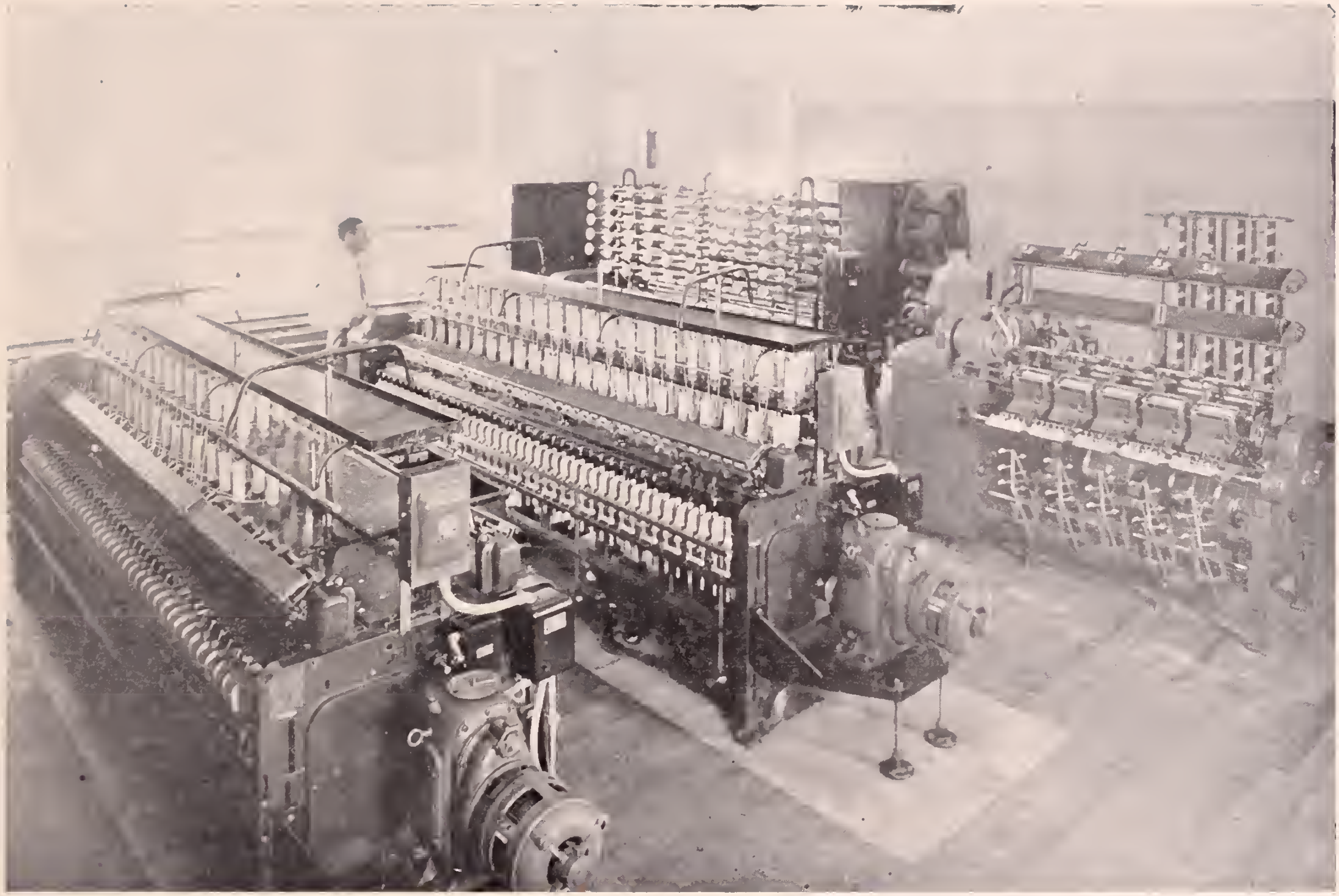
If a man is to have a period of training in the plant in which he is to work, before he actually takes over the job, he will find the task of "breaking-in" much easier than if he begins working regularly from the start. By this means he will get to know the workers, the particulars of the job, and will get some idea of how to go about the duties of the job.

One of the first things he will need to do is to secure the confidence and cooperation of the workers. I place this as "first" because once the new man has gained this confidence and cooperation, the workers will go to almost any limits to help him. On the other hand, if he antagonizes them, they can put the proverbial thousand and one petty interferences in his way. It is to any new man's advantage to think out a definite program for winning the confidence and well wishes of the workers. Some help along this line might be gained by reading such books as Dale Carnegie's HOW TO WIN FRIENDS AND INFLUENCE PEOPLE.

In dealing with the people in the mill, a man will have to deal with many different types of people. His preconceived ideas that the workers all belong to some special class must be discarded. As in other groups, each of them is an individual and must be treated accordingly. They will range from the most illiterate to the high school graduate, and in some cases to those with college degrees—working as operatives in the mill. One thing that should be kept in mind is the fact that, even though the old fixer or other worker may not express himself in the best of English, there is still much that may be learned from him. He must get the worker's ideas on such things as increasing efficiency, bettering working conditions, improving quality, and one gets in addition the interest of the worker because he will feel that there is importance in the job he is doing. While he is learning from the worker, it is also important that the new man teach his associates anything he can that will be of help to them.

One of the greatest aids to friendly relations in the mill is the taking part in the community activities of the mill. If possible, the new man should live in the community, go to church there, and support all projects carried out by the workers. Most workers are intensely loyal to their athletic teams, their schools, and any other thing which they feel is their own. By taking part in the community life, a new man can let the people know that he is on their side. A man should always strive to get things done with as little friction as possible. If he always tries to put himself in the other man's position, he can have far greater understanding of the problem. One should always remember that the workers will respond to courteous, fair and just treatment just as quickly as he himself does.

With the resolve to always be the gentleman he admires others for being, there is a successful career ahead for the Clemson textile graduate.



General view of the spinning section in the Government Spinning Laboratory in the Clemson textile school.

Government Spinning Laboratory

By A. M. HAND

In 1921 the United States Department of Agriculture, in cooperation with Clemson College, established a cotton spinning laboratory in the Textile School at Clemson. It has been maintained here continuously since then, except for a brief interval between 1921 and 1923 when the laboratory was moved to N. C. State College at Raleigh.

This laboratory is under the guidance of Mr. J. M. Cook, who is assisted by a staff of nineteen persons, of whom fifteen are technical and professional and four are clerical and statistical workers. Mr. Cook has been stationed here since 1930 and was named head of the laboratory in August 1936. The only similar laboratory is maintained in College Station, Texas, in cooperation with the Agricultural and Mechanical College of Texas. The South Carolina laboratory is known as the Clemson Laboratory and the one at College Station is known as the Texas Laboratory.

The following types of work are carried on at the Clemson Laboratory:

Cotton samples are sent from various Federal and State experimental stations throughout the Cotton Belt, in connection with the Federal-State cotton breeding and improvement programs, to be tested for their fiber and spinning qualities. Tests are made to determine the fiber length, fiber fineness, fiber maturity, fiber strength, and fiber structures, as well as spinning qualities. The purposes of these studies are to determine the comparative spinning performance of leading varieties or of new strains of cotton having commercial promise, grown at different

Table 1—Fiber Laboratory Test Results for Some Varieties of Upland Cotton Grown at Specified Locations, Crop of 1945[a]

Place of Growth and Variety[a]	Length (Fibrograph)			Fineness (weight per inch of fiber)	Mature Fibers	Fiber tensile strength[b]	X-Ray Angle
	Upper half mean	Mean	Uniformity Ratio				
	Inches	Inches	Index	Micrograms	Per cent	1,000 lbs. per sq. in.	Degrees
Statesville, N. C. (c)							
Coker 100-8*	1.05	0.80	76	3.9	76	73	38
Coker 100-9	1.05	.77	73	3.8	75	76	35
Coker 100 Wilt-4	1.09	.86	79	4.2	78	74	37
Coker 100 Wilt-5	1.05	.84	80	4.0	77	74	38
Coker 200-5	1.08	.84	78	4.5	84	76	38
Deltapine 14 (060)	1.02	.79	77	3.9	76	73	40
Stonewilt 5	1.03	.84	82	4.4	82	71	39
White Gold 4	1.05	.82	78	4.0	69	76	35
Florence, S. C. (d)							
Coker 100-8*	1.10	.82	75	3.9	76	70	40
Coker 100-9	1.06	.77	73	4.0	79	70	38
Coker 100 Wilt-4*	1.07	.84	79	4.5	79	67	40
Coker 100 Wilt-5*	1.05	.81	77	4.4	79	68	38
Coker 100 Staple 1	1.09	.80	73	4.1	76	67	41
Coker 4 in 1-7*	1.06	.79	75	4.4	84	71	39
Deltapine 14 (060)	1.05	.81	77	4.3	81	69	40
Stonewilt 5	1.03	.79	77	4.5	84	68	41
Experiment, Ga. (e)							
Acala 1517	1.05	.80	76	3.9	76	90	30
Coker 100-9	.97	.68	70	3.9	77	81	34
Coker 100 Wilt-5	.98	.72	73	3.8	67	78	36
Deltapine 14 (060)	1.04	.77	74	4.2	77	76	37
Empire 2910*	1.00	.71	71	4.2	71	80	31
Stoneville 2B (8275)*	.99	.73	74	4.2	76	80	31
Stoneville 62 Dunlavy	.92	.71	77	4.4	75	77	32
Stonewilt 5	.98	.73	74	4.0	76	74	36
Knoxville, Tenn. (f)							
Coker 100 Wilt-5	1.08	.87	80	4.4	80	74	38
Deltapine 14 (060)	1.04	.82	79	4.2	81	76	38
Empire 7-8921	1.09	.86	79	4.2	74	83	33
Empire 2910	1.10	.87	79	4.2	74	82	32
Stoneville 2B (8275)	1.06	.83	78	4.2	76	79	33
Stoneville 2C (7303)	1.09	.85	78	4.0	74	80	34
Calhoun, La. (g)							
Bobshaw 1-819*	1.04	.76	73	4.4	77	78	36
Coker 100 Wilt-5*	1.09	.83	76	4.4	80	73	38
Dixie Triumph 366-789	1.12	.85	76	4.4	82	77	36
Dixie Triumph 366-030	1.03	.82	80	4.7	76	68	40
Stonewilt 5	1.08	.85	79	4.4	80	70	39
College Station, Tex. (h) (Main Farm)							
Deltapine 14 (060)	.97	.73	75	4.3	82	82	31
Hibred	.75	.60	80	5.5	77	82	31
Macha	.82	.65	79	4.4	70	82	32
Rogers Acala 111*	.91	.68	75	3.8	74	86	26
Mebane (Buckallew)	.89	.69	78	5.2	80	71	34
Safford, Ariz. (i)							
Acala 1517*	1.08	.80	74	3.6	79	89	31
Acala P 18-C*	1.02	.76	75	3.7	75	76	41
Acala 1517 Wilt	1.05	.75	71	3.4	69	91	32
Santan Acala	1.07	.80	75	4.1	82	72	41

(a) Taken from Tables in "Results of Fiber and Spinning Tests for Some Varieties of Cotton Grown in the United States, Crop of 1945," Cotton Branch, Production and Marketing Administration, USDA.

(b) Converted from Pressley index according to the following formula: Tensil strength equals (10.8116 x Pressley index - 0.12).

(c) Plantings were made the first of May. Growing conditions during May and June were about normal. Excessive rain in July resulted in more than normal weed growth. August was ideal for cotton development. Eleven inches of rainfall in September delayed opening about 2 weeks. The weather during the harvesting period, October 1 to November 10, was generally favorable.

(d) The weather was warm during the latter part of March and the first of April. During the latter part of April and through the first of June, the weather was generally unfavorable for plant growth and development. Heavy infestation of boll weevil occurred during July and August; the damage, however, was light. The cotton was harvested near the middle of September, after having been exposed to considerable rain during the early part of the month.

(e) Spring storms destroyed the first plantings, which were made on April 21, and caused extremely poor stands from the second plantings, made on May 22. Plant growth and development were late and poor. The crop was harvested late in October following an extensive period of rainy weather.

(f) Weather and soil conditions at planting time (April 23) were favorable. Immediately following the planting period, however, the weather and soil were cool and wet. Stands were badly depleted and growth development was poor. The weather during June was generally dry and unseasonably cool. Tarnished plant bugs prevented normal fruiting of the crop.

(g) The weather conditions were generally unfavorable for plant growth and development throughout the year. Cool and damp weather prevailed during the germination and seedling periods. Excessive rains during the fruiting period favored rapid propagation

Table 2—Commercial classification, manufacturing performance, and carded yarn quality results for some varieties of upland cotton grown at specified locations, crop of 1945

Place of growth and variety 1	Grade (1) 2	Picker and card waste 3	Naps per 100 sq. in. of card web 4	Staple length		Yarn strength (lbs. per 120-yd. skein)			Yarn appearance grade (4)		
				Classer's (1) 5	Equivalent (2) 6	22s 7	36s 8	Third count spun (3) 9	22s 10	36s 11	Third count spun (5) 12
		Percent	Number	Inches	Inches						
Statesville, N. C.											
Coker 100-8 *	GM	6.7	12	1	1 3-32	121	64	42(50s)	Bx	Cx	Cx
Coker 100-9	GM	7.0	12	1	1 1-8	125	66	44(50s)	Bx	B	Cx
Coker 100 Wilt-4	GM	7.9	5	1	1 1-16	118	64	42(50s)	Bx	Cx	Cx
Coker 100 Wilt-5	GM	6.9	8	1	1 1-8	122	66	44(50s)	B	B	B
Coker 200-5	GM	7.0	6	1	1 1-32	114	61	39(50s)	Bx	B	B
Deltapine 14 (060)	GM	5.8	6	1	1 3-32	122	65	43(50s)	Bx	B	B
Stonewilt 5	GM	6.2	8	1	1 1-16	118	64	42(50s)	Bx	B	Cx
White Gold 4	GM	5.8	10	1	1 3-32	121	64	42(50s)	B	Cx	Cx
Florence, S. C.											
Coker 100-8 *	M	8.5	10	1 1-32	15-16	101	54	26(60s)	Bx	Cx	Cx
Coker 100-9	M	9.4	8	1 1-32	15-16	100	53	26(60s)	Bx	Cx	Cx
Coker 100 Wilt-4 *	M	8.5	8	1	7-8	95	51	33(50s)	Bx	B	Cx
Coker 100 Wilt-5 *	M	12.1	14	1 1-32	7-8	95	50	24(60s)	Bx	Cx	Cx
Coker 100 Staple 1	SLM	8.7	10	1 1-32	15-16	101	53	27(60s)	B	Cx	Cx
Coker 4 in 1-7 *	M	8.6	11	1 1-32	29-32	102	54	25(60s)	Bx	Cx	Cx
Deltapine 14 (060)	M	8.5	11	1 1-32	15-16	105	56	27(60s)	B	B	Cx
Stonewilt 5	SLM	9.3	11	1	29-32	98	52	34(50s)	Bx	B	Cx
Experiment, Ga.											
Acala 1517	M lt sp	8.3	17	1 1-32	1 5-32	125	68	35(60s)	B	Cx	Cx
Coker 100-9	M lt sp	9.2	16	1 1-32	1	110	57	28(60s)	B	Cx	Cx
Coker 100 Wilt-5	SLM	9.2	16	1 1-32	1	113	60	29(60s)	B	Cx	Cx
Deltapine 14 (060)	SLM	7.7	11	1	1	113	59	39(50s)	Bx	Cx	Cx
Empire 2910 *	M lt sp	9.0	13	1 1-32	1	110	59	28(60s)	B	Cx	Cx
Stoneville 2B (8275) *	M lt sp	8.3	12	1	1	110	58	40(50s)	Bx	B	Cx
Stoneville 62 (Dunlavy)	M lt sp	8.6	11	1	15-16	103	54	35(50s)	Bx	Cx	Cx
Stonewilt 5	M lt sp	9.5	18	1 1-32	31-32	108	58	27(60s)	Bx	Cx	Cx
Knoxville, Tenn.											
Coker 100 Wilt 5	M	8.5	10	1 1-16	1 3-32	124	65	33(60s)	Bx	Bx	Cx
Deltapine 14 (060)	SM	7.6	12	1 1-32	1 1-8	126	67	34(60s)	Bx	Bx	B
Empire 7-8921	M	8.5	12	1 1-32	1 1-8	126	66	34(60s)	Bx	B	Cx
Empire 2910	M	8.3	14	1 1-32	1 5-32	130	68	35(60s)	Bx	B	Cx
Stoneville 2B (8275)	SM	8.3	12	1 1-32	1 1-8	121	66	34(60s)	Bx	B	Cx
Stoneville 2C (7303)	M	8.7	10	1 1-32	1 1-16	118	64	32(60s)	Bx	B	B
Calhoun, La.											
Bobshaw 1-819 *	SLM	8.9	17	1	15-16	105	56	36(50s)	Bx	B	B
Coker 100 Wilt-5 *	SLM	9.1	23	1 1-32	31-32	106	57	30(60s)	B	B	Cx
Coker 4 in 1-7	SLMbr	7.7	19	1 1-16	1	107	58	29(60s)	B	Cx	C
Miller 06 *	SLM	8.2	9	1 1-32	7-8	96	51	25(60s)	B	B	Cx
Stonewilt 5	M	8.0	19	1 1-32	31-32	105	57	30(60s)	Bx	B	Cx
College Station, Tex. (Main Farm)											
Deltapine 14 (060)	SLM	9.2	24	1	1 1-32	110	62	40(50s)	Bx	Bx	B
Hibred	SLM	9.3	10	13-16	13-16	84	50	146(14s)	Bx	Bx	Bx
Macha	SLM	9.2	12	7-8	7-8	94	50	39(44s)	Bx	Bx	B
Rogers Acala 111 *	SLM	8.2	23	31-32	1 1-16	116	65	41(50s)	Bx	B	Cx
Mebane (Buckellew)	SLM	8.2	19	31-32	13-16	91	48	30(50s)	Bx	B	B
Safford, Ariz.											
Acala 1517 *	SLM EW	9.2	30	1 1-16	1 7-32	133	72	38(60s)	Cx	C	C
Acala P 18-C *	SLM EW	11.5	22	1 1-32	31-32	105	56	28(60s)	Cx	Cx	C
Acala 1517 Wilt	SLM EW	9.8	21	1 1-32	1 1-8	126	67	35(60s)	Cx	C	C
Santan, Acala	M EW	9.6	28	1 1-32	1	108	57	29(60s)	Cx	C	C

(1) Classer's designation based on Official Cotton Standards.
(2) Average for three counts of yarn.
(3) Figures in parentheses indicate yarn count spun.
(4) In accordance with yarn appearance standards of American Society for Testing Materials.
(5) See column 9 and footnote 3.
X Indicates plus.

of boll weevils. Precipitation during the harvesting season was above normal.

(h) Ample moisture in the soil at planting time aided germination and a good stand was obtained. During May, June, and July, rainfall was above normal but was well-distributed throughout the period. The crop did not suffer at any time during the blooming period from lack of moisture. Boll weevil infestation was above normal. Continued rains during late August and early part of September caused considerable weather damage.

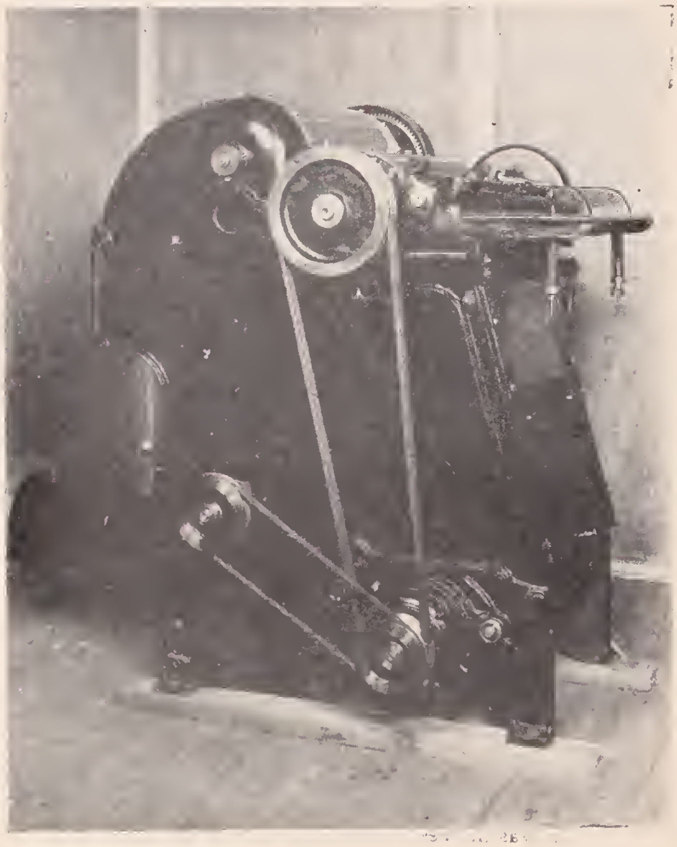
(i) During the early spring and summer months temperatures were near normal. The first irrigation was applied about the middle of July. Relatively small water supply limited the irrigations to less than optimum. Unusually hot weather in September caused the crop to mature early. Stinkbug damage was severe. Wilt was also severe but less than normal. The crop was harvested under favorable weather conditions.

* Indicates that variety or strain is in commercial production in that general area.

locations throughout the Cotton Belt; and to indicate the effects induced by different seasonal, soil, and climatic conditions on the spinning and fiber properties of cotton.

Other major phases of work being carried on are these: (1) Service testing is offered for cotton growers, breeders, mills, and others. This is an increasingly important function, which makes it possible for them to submit cotton and cotton products to the laboratory for testing—on a fee basis. The charges made are in proportion to the amount of work involved in the process needed. (2) Tests on cotton (Staple and Grade) standards are conducted on both fiber and spinning to hold them in line insofar as they are related to each other. (3) Research work to determine the importance of various fiber properties to the spinning qualities of cotton. (4) Research and investigation towards developing instruments and techniques for testing.

The accompanying tables include the results of fiber and spinning tests on some of the leading varieties of cotton grown during the 1945 season at different Federal and State experimental stations. These tests were conducted in the laboratories of the Cotton Branch of the Production and Marketing Administration, USDA, which are operated in cooperation with Clemson Agricultural College and the Bureau of Plant Industry, Soils, and Agricultural Engineering. Other cottons were also tested at the College Station, Texas, laboratory, in cooperation with the same Department of Agriculture agencies. These results are valuable to mills, cotton breeders and growers in deciding what kinds of cotton are best suited for their purposes.



The Shirley Analyser is used in determining the amount of foreign matter in lint.

Most of the textile machinery used in tests at the Clemson laboratory is of regular commercial design with minor modifications in order to adapt the equipment to special requirements of the test work. Rigidly specified humidity conditions are necessary in making most of the manufacturing tests and these conditions are made possible by automatic-controlled humidifiers. When tests are made on yarn, cord and fabric, temperature and relative humidity are controlled to "standard" conditions—70 degrees F. and 65 per cent R. H.

The yarn and fabric testing laboratories have the most modern devices available for textile testing. They include the following kinds of apparatus: tensile strength testers for yarn in single strand and skein forms, testers for tire cord and fabrics, automatic yarn reel, motor-driven rotary racks for conditioning specimens, fabric bursting strength tester, yarn numbering quadrants, several twist counters, sliver evenness tester, roving numbering quadrants, roving tester, electric oven for the determination of moisture regain, stroboscope for studying the action of travelers, fliers and other fast moving parts of textile machinery, several types of tachometers, complete equipment for making cotton fiber strength, maturity, and fineness measurements, microscopes, chemical balances and various other important pieces of equipment. The Shirley Analyser and one automatic single strand tester were imported from England. The former is used for determining the amount of foreign matter in lint.

The laboratory also has a sample slasher that was developed by the Clemson Laboratory staff. Use of this slasher allows the slashing and weaving of quantities of yarn as small as one and a quarter pounds and the determination of manufacturing performance of different cottons from the results obtained from only five pound samples. This laboratory slasher may be of interest to—and could be put to use by—concerns that manufacture a large number of samples of cloth for commercial purposes, as well as to laboratories that are faced with the problem of weaving fabrics from small lots of yarn.

Mr. Cook has described the machine as consisting of "a narrow steel frame which is approximately 36 inches high, a convenient working height, with the guide rolls, combs, squeeze rollers, and leasing rollers mounted on top of this frame. The size box and drying chamber with its coils, fan, and electric switches, are attached to the frame between the floor and the top. On the T-shaped front of the machine is mounted a movable carriage, equipped with rollers from side to side on the frame. The bearings for the loom beam and a variable speed drive along with the required bearings and shafts for driving the squeeze rolls, are mounted on the carriage.

(*See page* 20)

Antique Equipment Presented to School

Dr. R. F. Poole, President of Clemson College, always has had an appreciation for antiques and has been particularly interested in the establishment of a textile museum at Clemson. Mr. John B. Humbert, Manager and Assistant Treasurer of the Utica and Mohawk Cotton Mills, Inc., Seneca Division, Seneca, S. C., presented to the textile school on March 3 a valuable collection of antique textile equipment which he had been assembling for many years.

Mr. Humbert, a graduate of Wofford College, has been prominent in the textile industry in South Carolina for almost 50 years, and has always been interested in Clemson's School of Textiles. He has been actively interested in the Boy Scouts and in young men, many of whom he has helped in their efforts to obtain college educations. His principal hobby has been the collection of antique textile machinery.

Dr. Hugh M. Brown, Dean of the School of Textiles, has stated that the school is most fortunate in receiving Mr. Humbert's collection and feels that it will serve as a valuable stimulus to the students in the school. Dean Brown says that a room in the textile building will be set aside for the school's museum and that he hopes that additional equipment will be donated by other interested manufacturers.

The equipment included in Mr. Humbert's gift to the school consists of a hand loom, a rare "combination textile machine," several spinning wheels, a reel, a warper, and a scale model of a bale presser.

A description and the history of this equipment is given as follows:

The hand loom which stands about six and a half feet high, five feet long, and five feet wide, and a stool for the operator were made entirely by hand in 1860 by Mr. James Floyd of Liberty, South Carolina. The loom was originally owned by Mrs. Nancy Boggs Taylor, later married to William Dodd of Calhoun, South Carolina, who operated it in making blankets, table cloths, counterpanes, towels, and various other kinds of cloth needed to make clothing for the family. The loom was purchased by Mr. Humbert from one of Mrs. Dodd's children in 1928. The loom was made almost entirely of wood, the only metal parts being the ends of the warp beam. There are two double harness. Reeds for the loom were made by splicing thin strips of ordinary bamboo and securing them between strips of wood tied together with cord. Several hand-made shuttles and bobbins were included with the loom, which is still in a usable state.

Mr. John B. Humbert (center) explains to President Poole (left) and Dean Brown how he acquired the antique spinning wheel in the center foreground.

One of the large spinning wheels has the same history as the hand loom and was used in connection with the loom. The spinning wheel was also hand made.

The "combination textile machine" is one of three known to exist in the United States. A similar machine is displayed in "The Hermitage", home of Andrew Jackson near Nashville, Tennessee. Mr. W. R. Armstrong, a prominent textile executive of Gastonia, North Carolina, exhibited the third one at the Southern Textile Exposition, held in Greenville, South Carolina, about fifteen years ago. It was on display in the Universal Winding Company's booth. It is said of the Armstrong machine which is similar in every detail that it was probably built in the United States, and that it was approximately a hundred and fifty years old.

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Progress in Bleaching

PROF. JOSEPH LINDSAY, JR.
Head of the Department of Textile Chemistry and Dyeing
Clemson College

Prof. Lindsay at work in Textile School Research Chemistry Laboratory.

The old time bleacher took the winter off! Although this statement may not be true for all old timers, it pretty well pictures the pace of world textile processing in general and bleaching in particular up to 150 or so years ago. When we contrast this picture with one of our modern bleacheries—thousands of yards of cloth processed per day—cloth moving, always moving, day and night, year in and year out, we realize that the changes in methods have been tremendous, and that few of our bleachers spent their winters in Florida.

Looking back over the years, we find that there are no definite records of what the ancients employed as bleaching agents, but we do find that the Chinese, along with others of the Far East, were bleaching, or at least whitening, cloth several thousand years ago. Their methods were brought to the Near East by the Arabs and Phoenicians and from there it spread throughout Europe.

We find records of the art of whitening of materials during the heyday of the Near East in hieroglyphics in the tombs of the Pharaohs. The scenes depict the continuous systems of that day, and each step was a man performing his part of the job. The first man, the saturator perhaps, rubbing the cloth in an unknown liquid in a vessel; the second man, the extractor, shaking the piece and wringing it out; the third, the framer, stretching it and hanging it in the air. How long it must hang there before it became white enough is not recorded, but it is known that exposure to sunlight, air and moisture was the only bleaching method worthy of note until almost the beginning of the nineteenth century.

During the three centuries preceding 1800, bleaching throughout Europe has been described by the historians, and seems to be a close approximation of the story of the hieroglyphics. During this period bleaching was confined almost entirely to linen goods. The other major fibers, wool, silk and cotton, were considered naturally white enough without special treatment, but the high pectin content of flax made bleaching essential in obtaining the beautiful linens which were so popular in those years.

Throughout this period, since no chemical process as we know it was available, the whitening of fabrics depended upon their exposure in the damp state to the atmosphere. This required a tremendous amount of hand labor as well as large investments in land on which to expose the goods. Carefully prepared grass areas were used as exposure plots, and the keepers of these beautiful greens or lawns were important cogs in the bleaching process. The plots must be properly sloping for drainage, free from irregularities, and as clear as possible of small stones, sticks or other trash which might become caught on the goods and cause damage later.

This "grassing" or "crofting" treatment was only a part of the whitening process. The cloth must first be treated in alkali, "bucked or bawked," and each piece, perhaps fifty or sixty yards, was then conducted out to the exposure plots by two men. There it was fastened down, and while so placed constantly sprinkled with water during the day to keep it moist for proper reaction. Dew acted as the dampening agent at night. Because the grassing areas were unenclosed, guards were necessary at night to prevent damage to the valuable goods by stray animals as well as to stop some "interested party" from taking a couple of pieces home for his personal use. Very stringent laws were in force to protect the goods during this exposure period.

After the required number of days, or weeks, of exposure, the pieces were escorted back into the dye room and given additional alkaline treatment. These steps of alkaline boiling and outside exposure were repeated as many times as the hand bleacher considered necessary to give the proper degree of whiteness. The number of treatments depended in some degree on the type of goods, and the length of exposure varied with the season of the year and the weather conditions during a particular period. March to October was by far the best period and the short, cold, foggy days of the remaining months were very unsatisfactory. We can see therefore that the bleacher of those days might well take the winter off.

For over two hundred years, until the middle of the eighteenth century, when bleaching became a national industry in Ireland, the North Sea region of the Netherlands around Haarlem was acknowledged the best location for grassing. Linens made in many other countries were sent into Holland, and upon their return, the finished goods were reportedly sold as "Dutch linens" to take advantage of the superior reputation of these Haarlem bleachers. An idea of the great amount of time involved may be seen from the fact that a shipper of grey linen from no farther away than the British Isles did not expect the bleached goods back before six months. Our grey mills would love this delivery today!

An important step in the whitening by the grassing method was the "sour" or treatment of the goods after the alkaline boils with sour milk. The lactic acid of the milk served to make the impurities of the linen easier to remove. It was necessary to steep the cloth for several days, but since the milk was cheap and easily available, millions of gallons were reported to have been used over the years for this purpose. The simple substitution of dilute sulfuric acid, at a somewhat later period, shortened this time of steeping from four to five days to only one day.

Although this slow grass method of bleaching persists in a small way in some sections of the world, the commercial processes of today had begun to take shape almost two hundred years ago. Scheele, a Swiss, discovered chlorine in 1774 and Tennant succeeded in manufacturing bleaching powder from lime and gaseous chlorine around the turn of that century. This bleaching powder was rapidly adopted for the bleaching of cotton and linen.

With the perfection of proper machinery, we Americans began to come into the picture and the so-called "American Process" became recognized in the 1830s. It was very similar to the full chlorine type bleach of today, and required singeing, steeping in bleaching powder solution, "chemic", and souring again. In our present day processes the most important changes have been the substitution of caustic soda for lime, and the use of sulfur dioxide gas in solution as a sour and anti-chlor. Chlorine in such forms as sodium hypochlorite or chlorite is also very commonly used to replace the older chemic. This method continued to be almost the only large scale process for cellulose fibers until well up into the present century, when peroxides began seriously to come into the picture.

Looking back again, we find that the climb of peroxides into large commercial use was nothing like as rapid as that of bleaching powder. Hydrogen peroxide was discovered as far back as 1808, but commercial use of peroxides was still almost unknown a century later, as we may see from the following extracts taken from a Textile American editorial of March 1905. This editorial is prophesying a bright future for sodium peroxide and states among other things:

"The days are drawing rapidly near when our many troubles due to faulty and imperfect bleaching are over . . . this will have come about when our mills will have relegated to the dark ages the sulphur house, the bisulphite vat, and the 'chemic', and instead of that will have installed beautiful white tubs into which goes nothing but nature's own bleaching agent, ozone, or, in tangible form, Peroxide of Sodium . . . It is understood that this chemical (Peroxide of Sodium, not so very long ago a laboratory curiosity) is now manufactured in such quantities as to allow its sale at a price which permits it to compete with lime and sulphur . . . as chemistry has found a way of collecting and concentrating those natural forces which in infinite dilution accomplished the grass bleach and allows them to be applied in their concentrated form with an enormous saving in time, and with actually the same effect." It was at least eight or ten years after this announcement that peroxides really began to be used in large quantities for bleaching purposes.

Peroxides have of course one big advantage over chlorine type bleaches, they may be used for all fibers, whereas the chlorine derivatives are under normal conditions unsatisfactory except for the cellulose fibers. This advantage is not so important however in view of the fact that there is only a comparatively small yardage of materials bleached which is not made from cellulose fibers. Each year approximately 250 million pounds of cotton go into sheets and pillowcases alone, articles which are almost universally bleached before use. Cotton goods are therefore by far the major field of interest for the seller of bleaching agents.

The method most largely used for bleaching cotton with peroxides has been along the same lines as the older chlorine bleach. It involved the use of kiers and there-

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Textile Scholarships at Clemson

By L. H. BUCHANAN

Today as never before, the textile industry recognizes the importance of higher education for the personnel of that industry. This is evidenced by the fact that there were no textile scholarships available before the war, whereas at the present time there are two active scholarship funds set up at Clemson by textile organizations. One of these was recently established by the Pendleton Manufacturing Company, Pendleton, South Carolina, and the other (several years earlier) by S. Slater and Sons, Inc., of Slater, South Carolina.

The Slater Scholarship Fund was established by Mr. S. Slater in the summer of 1942. His purpose in creating this fund was the advancement of education in the Slater community.

The Slater family has been interested in education as far back as the Textile Pioneer in America, Samuel Slater. "Samuel Slater is also credited with commencing a pioneer Sunday-School which he opened at first in his own home. In its beginnings this school was not intended primarily for religious instruction. He introduced the system of Sunday-School instruction which he had seen in operation in the mills in England. The Slater Schools were continued for a number of years. These New England Sunday-Schools were subsequently taken under the care and patronage of the different religious organizations.

"Samuel Slater's interest in schools also extended to the common day schools. He helped with the creation and maintenance of day schools in all of the villages in which he established mills." The Slater family is still carrying out the promotion of education in textile communities.

The Slater fund set up at Clemson is provided by Mr. H. N. Slater III, and the scholarships are given to qualified graduates of the local Slater-Marietta School. A similar fund has also been set up for girls to attend Furman University, Greenville.

There are no obligations attached to the scholarship fund established by Mr. Slater. The student may take any course he desires, with the scholarship fund serving as an aid. It provides for a full four year course.

Each year two boys and two girls are chosen from the graduating class of the Slater-Marietta School by the faculty and the scholarship committee, headed by Mr. Frank Cook of the Slater organization. These students are chosen on the basis of their scholastic ability, character and qualities of leadership. Financial need is also taken into consideration by the Scholarship Committee. The four scholarships are awarded each year at the graduating exercises.

The war years saw the program somewhat disrupted, but there has been one student to graduate, who entered Clemson under the scholarship plan. F. J. Brannon, Jr., was graduated with the class of 1946 with a B. S. degree in Textile Engineering Since that time he has been employed by S. Slater and Sons as assistant production manager.

Students who are currently enrolled at Clemson and who have scholarships from Slater are: Lawrence H. Buchanan, Senior Textile Engineering student; James E. Barnett, Sophomore Pre-Medicine student; William R. Vassey, Freshman Arts and Sciences student; and Clelle Buchanan; Freshman Arts and Sciences. Buchanan and Barnett are veterans who have returned to school after spending some time in the armed forces.

The Pendleton Manufacturing Company has set up a fund at Clemson similar to the Slater fund. This scholarship, which provides funds for one day cadet's expenses, including tuition, fees, and uniform charges, was established last year. The first student to enter Clemson on this scholarship is Billy Ray Adams, Freshman Textile Manufacturing student from Pendleton. The scholarship stipulates that the recipient must be enrolled in a textile course.

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Textile Opportunities

By H. R. VALERIUS, JR.

There are a great many opportunities in the textile industry for graduates of Clemson College. Not only is there a great demand within the cotton textile industry in this and surrounding states, but there are other constantly increasing forms of textile manufacturing. One of these is the woolen and worsted textile producing industry.

Woolen manufacturing in the South has been very limited until a relatively few years ago. It is, however, a potentially large field for this section and is increasing at the present time. Probably the most recent woolen mill is the Deering Milliken woolen spinning plant at McCormick, South Carolina. The building has 116,000 square feet of floor space, and will contain 20,000 spindles when the remainder of the machinery is installed. After the wool is spun, it is sent to Abbeville for dyeing, and then to the Deering Milliken mill at Johnston to be woven. There are other woolen mills in South Carolina, and plans for many more new ones when the present scarcity of building materials and textile machinery no longer exists.

The South has for many years been the center of the cotton textile industry in the United States. The greatest increase in the number of manufacturing establishments in the South has taken place since 1900, and the value of the products has increased proportionately during the same period. It stands to reason that, if it is more beneficial for the cotton textile industry to move to the Southern states, these same advantages can be utilized by the woolen and worsted industry. At present the trend is toward building up woolen production in the South, with the manufacturers now looking to the Southern states. Just as South Carolina was among the leaders in the development of the cotton textile industry in this part of the country, it is now a potential leader in the establishment of woolen mills.

It should be of interest to textile students to know that South Carolina offers many possibilities for their talents outside of the cotton industry. It is hoped that this article will acquaint the student and others with some of the factors that have influenced—and will continue to influence—the trend of woolen and worsted manufacturing to expand in the South. Woolen and worsted mills now operating in the South are not located in crowded areas. The South offers room for expansion, pure wholesome air, and the elimination of slums and smoke which accompany all large industrial areas.

At the time the textile industry was intorduced into the United States, the Northern states, with their abundant supply of power and skilled industrial workers naturally became the textile industrial centers. The South was still the agricultural center of the nation. Thus New England became the location of the bulk of the new industry, and because many firms began in that section they have continued to operate there. It is a costly proposition for a manufacturing plant to move. However, if the change of location will substantially reduce production costs, both the manufacturer and the consumer will profit. It has been said that all industries move from one location to another to take advantage of cheaper production costs.

Southern industrialization got its start after the Civil War when the large plantations were made into smaller farms and the slave labor system was abolished. The South had found it necessary to diversify its economy. The introduction of the cotton textile industry was successful and thrived in the midst of the existing cotton growing industry. In 1880 four Southern states, Georgia, South Carolina, North Carolina and Virginia, produced only 2.6 per cent of this country's cotton textiles. About sixty years later, these four states were producing 53 per cent. Cotton textile production in the Northern states had been reduced from 85.4 per cent to 28.4 per cent during that same period.

Many of the established woolen textile mills are very old from the standpoint of both construction and equipment. In 1937, the largest supplier of looms for the manufacture of worsted and woolen products, Crompton and

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Cotton Textile Industry In South Carolina

LOCATION OF TEXTILE ESTABLISHMENTS

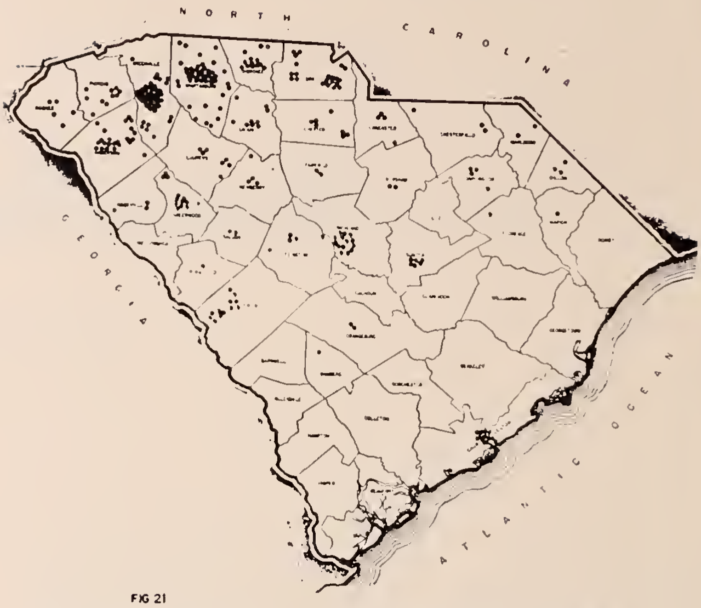

FIG 21

SOUTH CAROLINA
STATE PLANNING BOARD

EACH DOT REPRESENTS ONE ESTABLISHMENT
LOCATIONS SHOWN ARE APPROXIMATE

Just as the first World War clearly demonstrated to the United States the need for self-sufficiency in the fields of chemicals, dyes, and other materials, so half a century earlier had the Civil War shown to the South the necessity of an economy founded upon manufacturing as well as agriculture. Since that realization has become evident, the South as a whole has made rapid strides, which seem destined to continue for a long time to come.

Having lived from the land since the earliest settlement days, the South was reluctant to relinquish its way of life. Its people had already lost the war, their slaves, and often their worldly possessions. Tradition surrendered only when the cold facts were known: cotton and rice in storage in Southern ports could not be converted during the war into finished goods from other regions. Munitions, ordnance, shipyards, transportation and clothing were not available, and these essentials of war could not be supplied. In such fashion, then, did industrial growth begin its southward trek.

COTTON SPINDLES AND LOOMS

Year	South Carolina		United States		S. C. % of U. S. Total Spindles
	Spindles	Looms	Spindles	Looms	
1840	16,355		2,284,631		0.7
1860	30,890	525	5,235,727	126,313	0.6
1870	34,940	745	7,132,415	157,310	0.5
1880	82,334	1,676	10,653,435	227,383	0.8
1890	332,784	8,546	14,188,103	324,866	2.4
1900	1,431,349	42,663	19,008,352	455,752	7.5
1904	2,864,092		23,155,613	559,781	12.4
1909	3,754,251	96,281	27,425,608	665,652	13.7
1914	4,552,048	111,189	30,915,489	677,920	14.7
1919	4,949,225	116,932	33,795,681	693,064	14.6
1927	5,436,078	128,617	35,300,895	654,401	15.4
1929	5,603,910	132,772	36,360,633	659,823	15.4
1935	5,321,464	139,905	29,297,057	517,652	19.9
1940	5,518,724		24,749,578		22.3
1945	5,314,302		23,127,798		23.0

In several Southern states, the expansion of industry was dominated by the growth of the cotton textile industry. South Carolina was no exception, having pioneered the mass movement of that industry from the New England region. Today this industry, turning out more than a quarter of a billion dollars worth of manufactured products, dominates the scene.

Not until 1876, when the state government was returned to the people, was there any opportunity for industry to make any headway. Prior to this time, textile manufacturing was relatively low. It might be said that the first textile concern in the state was a factory for spinning silk, opened in Charles Town in 1766, when the state was producing silk in small quantities. Two years later a silk filature was built at Purrysburg.

The establishment of the early manufacturing concerns was motivated by the desire to obtain some degree of independence from the high tariffs existing at that time. Several plants were brought into being around 1830 when the tariff controversy was being aired. These ventures were none too successful for various reasons. The tariff of 1842 revived the interest in industrial independence, and establishments once more sprang into being. The textile industry witnessed some expansion at this time, with the value of manufactured cotton goods increasing between 1840 and 1850 from $359,000 to $748,338, more than hundred per cent increase in a decade. During this same period, capital investment in manufactures rose from $3,216,970 to $6,931,756. Although several lines of manufacture were established at this time, diversification was not complete, and the state remained under the dominance of cotton cultivation until after the Civil War.

Not until Gregg's success at his Graniteville mill in 1845 was textile manufacturing considered as feasible in the South. A third of a century later, however, all of the textile mills in the state were located in six counties, and from 1840 to 1860 the number of spindles in the state increased from 16,355 to 30,890, representing in both years less than one per cent of the nation's total.

These meager beginnings represented no more than a small wedge into the ancient plantation system, which was vigorously opposed to any industrial expansion at all.

The features of the state which favored industrial expansion had been enumerated in 1850 by J. H. Hammond in an address before the South Carolina Institute, at its First Annual Fair. He argued for the development of manufacturing industries by citing such advantages as low costs due to low wages, a plentiful power supply, and good transportation. In addition, manufacturing would provide an opportunity for investment of capital which was going elsewhere, and would furnish employment to many who, at that time, were not earning a decent living. Raw materials, particularly cotton, would be available at a minimum cost; the state would benefit from the income derived from manufacturing; and the price of cotton goods consumed in this section would be reduced through the elimination of transportation costs, duties, and middleman's profits. Despite these advantages, the state possessed thirty years later less than one per cent of the nation's spindles.

A NEW ERA

In the early years following the Civil War, only 8141 persons, less than one per cent of the total population, were earning a living through employment in manufacturing concerns. At the same time, the value of manufactured products was less than ten million dollars. Not until 1880 could any noticeable increases be seen as a result of the movement which began in the late 1870s. These increases were for the most part in the cotton textile industry, and from that time to the present that industry has served as a good index to the overall manufacturing progress of the state.

South Carolina's cry of "Eureka!" was heard—not in 1849—but in 1880. The boom, begun a few years earlier, was in full swing during the next decade. So strong was the desire for the establishment of cotton mills that their promotion took on the character of a campaign, with success measured in terms of mills actually established. The organization of mills was motivated not only by the desire of individuals seeking profits, but also by the desire to aid the community by affording employment to a large number of people. The desire for new industry was so strong that towns would vie with each other in building mills. At least half of the mills established during this period were community enterprises, and often the commencement of operation of a mill was marked by a ceremony. As a result of this stimulation by communities, many of the mills established were located, not at water power sites, but within the limits of cities or towns, or even in the middle of cotton fields. Later, when the community spirit was largely replaced by the commercial spirit, mills were established in unincorporated places because of lower taxes. This condition is still in evidence today, with many large mill communities still unincorporated.

While the New England textile centers continued to grow during the eighties, the Southern states set the pace in the expansion of cotton textile manufacturing. They are still setting the pace today. In South Carolina, between 1880 and 1890, the number of spindles more than quadrupled, increasing from 82,334 (0.8% of the nation's total) to 332,784 (2.4% of the nation's total). The number of looms increased over this period from 1676 to 8546. Cotton consumption in the South almost tripled, while it increased in New England by but 33 per cent. It was also during this decade that the mills began locating almost exclusively in the Piedmont section of the state, and today three Piedmont counties each may boast of more textile concerns than all of the coastal plain counties. No less than twenty-six textile mills were established between 1880 and 1890.

South Carolina's cotton textile industry continued to expand after the eighties, with forty-seven new plants being established by the end of the century. During this last decade before 1900, the number of spindles and looms was again quadrupled, and the state's share of the nation's total spindles jumped to 7.5 per cent. Also, by 1900, the South was consuming 1,523,168 bales of cotton, almost forty per cent of the United States total.

The state's peak of expansion was reached shortly after 1900, a year which saw the establishment of nineteen new textile mills. The number of spindles had doubled between 1900 and 1904, and the state's share in total spindles rose from 7.5% to 12.4%. By 1905, the cotton-growing states were consuming more cotton than the New England states, and active cotton spindles increased to slightly more than half the New England total. By 1926, the South contained more than half of the active cotton spindles in the nation and was using about seventy per cent of all the cotton. Whereas just after the first World War the New England states witnessed a decline in amount of cotton used and the number of active spindles, the South continued to grow in both respects. In 1945, the cotton-growing states consumed 8,455,038 bales of cotton, more than eighty-seven per cent of the nation's total; they had seventeen million of the twenty-two million spindles in the country. South Carolina alone contained twenty-three

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Loom Bracing

By LOUIS P. BATSON, JR.

Today, more than ever, mill operators are realizing that lost production and lost time can not be regained and they are trying to get more production and better efficiency at a reduced cost. Among the ways to which mills have resorted to get these desirable factors is the bracing of looms.

These loom bracers, which are castings extending from one loom side to the other, are added to give the loom additional stability and weight, making vibration much less. With this reduced vibration, the loom speed can be increased and maintenance costs can be decreased.

The most beneficial results from these braces can be obtained only if the condition of the loom is "tip-top" in its entirety. This stands to reason. One would not expect a car to be like new if it were painted while the motor was in poor condition.

If the loom is in good condition, braces should prove profitable in that they (1) eliminate destructive vibration, preventing unnecessary wear of parts and increasing the life of the loom; (2) enable the loom speed to be increased; (3) reduce mechanical breakdown and loom fixing, giving fixers more time for special problems; and (4) add strength to the crankshaft through extra bearings or crankshaft boxes.

It has been found that braces prove most efficient on E model looms. However, they are available for all types of looms and are coming out on the newer looms of the X family.

In various cases, it has been found unsatisfactory to increase loom speeds, depending upon the previous speed of the loom and the type of goods being woven. Supply costs would probably go up in a proportionate amount to the increased speed. If the loom speed is not increased, the reduced mechanical breakdown and the increase in the quality of the fabric woven would pay for the cost of these braces in a short time.

Only two concerns at present have done any extensive work on bracing looms and all of it has been done in the last five years. Both companies sell their products for less than two hundred dollars.

It would not be necessary to make any changes in the duties of the loom fixer by adding these braces to the looms. The only possible addition of labor that would be encountered would be the addition of an extra warp-change man and a battery filler. This may be necessary due to the loom speed increase.

The application of loom braces is an illustration of how mill men and engineers have turned stumbling blocks into stepping stones to success.

Who's Who

John T. Wigington, 1923 Clemson graduate in Textile Engineering, was recently named in the Tenth Anniversary edition of "Who's Who in Commerce and Industry." He is presently located at Clemson as Director of the Division of Technical Service of the Cotton-Textile Institute, Inc.

Upon his graduation from Clemson, Mr. Wigington accepted a position with the Ware Shoals Manufacturing Co. In 1924, he was made superintendent of the Lonsdale Company at Seneca. Two years later, he returned to Clemson to conduct cotton fiber and spinning research for the United States Department of Agriculture. In 1928, he became research engineer for the Textile Bag Manufacturing Association in Chicago.

Mr. Wigington was with the Department of Agriculture in Washington as a cotton technologist from 1929 to 1934. After serving a short while as superintendent of the Edna Mills at Reidsville, North Carolina, he returned to Clemson with the Department of Agriculture, where he remained until 1940. At that time, he was placed in charge of the Department's Cotton Spinning Laboratory at College Station, Texas.

Since 1941 Mr. Wigington has been associated with the Cotton-Textile Institute. He is a member of the Arkwrights, Inc., American Society for Testing Materials, American Association of Textile Chemists and Colorists, Industrial Fiber Society, Rotary International, Phi Psi Fraternity, and the Masons. He has been the contributer of numerous articles to professional journals, and several of his articles have appeared in *The Bobbin and Beaker*.

Professor Thomas A. Campbell, Jr., explains the principles of doubling and drafting to a class of students in the Cards and Drawing Frames laboratory.

PROGRESS IN BLEACHING

(*Continued from page* 11)

fore was only a semi-continuous or batch process. If fairly heavy goods are to be handled, especially if high absorbency is important, the preliminary kier boil under pressure for several hours is necessary before the actual peroxide bleach. Since this bleach also requires additional hours in a kier, peroxides have until recently offered little toward time saving over the chlorine derivatives. In the field of light weight goods and especially those with colored effects, however, it is possible with proper handling to eliminate the preliminary kier or caustic boil and obtain satisfactory results in a one-step process. This one-step method consists of bleaching in the kier for 6 to 8 hours in a mildly alkaline peroxide solution at about 180 degrees F. and then completing the treatment by rinsing thoroughly. Antichloring of course is not necessary after using peroxide as it is with hypochlorites.

As may be readily seen in both the chlorine and peroxide processes the chief time bottleneck has been the kier. Its use requires time to load and unload several tons of cloth in addition to the long hours of treatment with alkali or peroxide while in the kier. In addition the processor of extra heavy cotton goods, such as ducks, must use a yet slower method of boiling out. These very heavy goods will not stand the packing of several tons into kiers without the formation of permanent crush marks or creases, and have to be handled in open width on jigs. Since a jig will handle only a small yardage, the boiling was a slow expensive step.

Considering high speed production as the ultimate aim of all American manufacturing methods, several steps have been taken in this direction for bleaching processes in recent years. First a continuous boil-out for the heavier cotton goods was developed. The cloth is wound in open width into rolls and the rolls set up in open tanks. In operation the goods are wound slowly on to a second roller passing through hot alkali as they are drawn forward. The operation of passing from roller to roller may be repeated as many times as necessary as the cloth travels the length of the boil-out tank, and approximately two hours are required before the material is ready for the bleaching step. This bleaching may be done with either peroxide or chlorine compounds.

Another step toward streamlining the bleaching operation, has been the idea of continuous steaming to eliminate the kier or jig boil-out. The goods are first passed through a padder containing hot caustic soda, and then into a steam tight chamber at a speed which permits exposure to steam for 30 to 45 minutes depending upon the construction and moteness of the cloth. After steaming, the goods are rinsed and bleached with either peroxide or chlorine compounds. The steamer itself may be used for any of the hot bleaching methods.

The most integrated continuous processes of bleaching yet developed are two methods using peroxide. These have only been fully perfected during the recent war and since they are similar in principle will be outlined as one. In these processes, kiers are replaced by two J-boxes or Gant pilers which are tremendous J shaped bins built of smooth stainless steel and carefully insulated with magnesia and rock wool, or similar materials, in order to hold the goods at a uniformly high temperature. Before entering the first of these giant bins, the goods are treated in a saturator with caustic soda. They are then pulled along through the Gant box at a speed which permits each yard to remain in the box for the space of an hour. A temperature of approximately 200 degrees F. is maintained throughout the passage through this slack piler. After the piler treatment, the goods are rinsed, saturated with alkaline peroxide solution, taken through a second Gant piler treatment similar to the first, and after rinsing again emerge fully bleached. Some of these continuous systems have been set up to handle goods in the rope form, and others adapted for goods which must be treated in open width.

Viewing the bleaching situation as of today, we find two major processes in use: the semi-continuous, using the kier method, and the continuous method just described. In practice it has been found that there is not a great deal of difference in the cost of bleaching by the two methods. The continuous process gives high speed production, but requires rather expensive mechanical equipment, such as the heavy stainless steel J-boxes. The machines required for the kier method may be of much cheaper materials throughout and if hypochlorites are used the cost per pound for the bleaching agent is materially lower.

In a final backward look, we see that while we have made tremendous strides in saving time, we are perhaps even yet not too far ahead of the bleachers of the past. The principle of bleaching remains the same. We still employ alkali for removal of pectic matter from our cellulose fibers, and still use the same whitening agent that the old bleacher used. Of course this agent is now in convenient, concentrated forms, but is nevertheless oxygen and its action as a bleach is the same as when used in the slow acting form found in the atmosphere. We rush these days to make more white shirts, sheets and handkerchiefs, but the bleacher doesn't have the winter off.

GRADUATE WORK NEEDED

(*Continued from page* 3)

lems of textiles is dependent upon the mastery of education relating to the properties and uses of these products, it seems inevitable that courses in mathematics, physics, chemistry, botany, economics, and applied textiles are obligatory. In fact these courses offer the only way to a worthy master's degree in textiles. All along the line of educational progress men will profit by cultivating the esthetic qualities to the end that they may fully appreciate the art of understanding, working with, and leading others. These qualities one must acquire by observation, study, and practice.

PHI PSI

Iota Chapter of Phi Psi initiated eleven ranking textile students last November. Left to right, front row—R. R. Crowther, R. B. Willey, J. F. Webster, L. S. Croxton, R. E. Christenberry; back row—H. R. Valerius, Jr., J. C. Austell, L. F. McMakin, G. P. Robinson, and M. D. Heaton. Not pictured is W. C. Whitten.

GRADUATES

The chapter recently lost nine members by graduation at the end of the last semester. They are W. B. Greyard, Jr., who served as Senior Warden, T. E. Christenberry, Jr., J. W. Davis, W. M. Greer, J. B, Rhame, F. C. Rogers, Jr., T. A. Turner, Jr., and D. W, Walker,

F. C. Rogers is still at Clemson, but is now serving the school as Instructor in Textiles.

ANNIVERSARY

The twentieth anniversary of the chartering of Iota Chapter at Clemson will be observed this May. Phi Psi has the honor of being the oldest established fraternity on the campus, the local charter having been granted May 18, 1927.

Professor Dan P. Thomson, Assistant Professor of Carding and Spinning here at Clemson, i sa charter member of Iota Chapter.

NATIONAL CONVENTION

Plans are being made by the chapter to be well represented at the National Convention, the first to be held by the fraternity in six years, at the Hotel Charlotte, Charlotte, N. C., May 2-4. The convention is sponsored by the National Grand Council and the Alumni Chapter of Charlotte.

Iota Chapter is presently engaged in preparing an exhibit to be on display at the convention. This exhibit, which will represent some of the work being done by members of the fraternity, will be entered in the contest which is sponsored by the Grand Council. An award for the best exhibit will be given.

Iota President E. T. McIlwain asks that as many alumni as possible to make plans to attend the convention. Information about the convention may be obtained from J. V. Killheffer, E. I. DuPont de Nemours & Co., Charlotte.

Faculty Notes

Frank C. Rogers, Jr., and Harold B. Wilson were recently named to the Textile School Faculty, according to Dean Hugh M. Brown. At the same time, M. D. Moore, Jr., resigned to accept a position in industry.

M. D. Moore is now employed by Riverdale Mills, Enoree, South Carolina, to do research, testing and costing work. He served as Instructor in Textiles from July 1946 to February 1947 here at Clemson. While teaching at Clemson, "Doc" was faculty adviser for *The Bobbin and Beaker*. Before leaving, he expressed hopes of returning to Clemson in the near future.

HAROLD B. WILSON

Professor Harold B. Wilson received his B. S. degree in Textiles from Clemson in 1941. He was admitted to the faculty of the Textile School in February as Assistant Professor in Textiles.

Immediately upon his graduation from Clemson, Professor Wilson worked in Abbeville Mills for six months. He then accepted a position as Government inspector, and over a period of four and a half years worked in twenty-six textile mills. He was then employed by the Jackson Mills in Iva, South Carolina, before coming to Clemson to work for Mr. H. H. Willis as textile consultant. Professor Wilson has worked throughout the mill, but primarily he has worked with carding and spinning.

While a student at Clemson, Professor Wilson was a member of "The Tiger" staff and was "Oscar" his senior year. He was also a member of the Calhoun Forensic Society.

CLAUDE B. ILER

Claude Bartow Iler, Southern Manager of the Keever Starch Company, died February 18 at St. Francis Hospital in Greenville at the age of 52. He was a native of Piedmont, South Carolina, but spent most of his life in Greenville.

Mr. "Pip" Iler, as he was known, was a 1915 Clemson graduate in Mechanical and Electrical Engineering. While at Clemson he was a letterman in baseball. He served in World War I as a lieutenant on the Mexican border.

For a quarter of a century, he was associated with the Keever Starch Company, serving for the past seven years as Southern Manager. Mr. Iler was widely known and highly respected by men of the textile industry in the South.

FRANK C. ROGERS, JR.

Professor Rogers, member of the class of 1944, received his B. S. degree in Textile Engineering from Clemson in 1947. He accepted an appointment to the faculty of the Textile School as Instructor in Textiles.

While at Clemson, Professor Rogers was a member of Phi Psi and Mu Beta Psi fraternities. During the period between 1943 and 1946, Professor Rogers served in the United States Army, seeing active duty in the Philippine Campaign. He was discharged with the rank of First Lieutenant.

TEXTILE SCHOLARSHIPS

(*Continued from page* 12)

Mr. and Mrs. Elliott Springs have announced the establishment of a scholarship fund in memory of their son, Leroy Springs II, and his grandfather, Leroy Springs. The announcement of this fund was made last summer.

According to the "Springs Bulletin", "The funds will be available to provide both loan scholarships and paid scholarships, for both boys and girls.

"The loan scholarships will be awarded to boys and girls of scholastic ability and good character who show a financial need. They are giving preference to graduates of the High Schools in Lancaster, Fort Mill, Chester and Kershaw who have met the entrance requirements for the Textile Course at Clemson, Georgia Tech, or North Carolina State, or the Business Course at Winthrop.

"The amount and terms of the loans will be determined by the individual needs. All repayments will be used for other loans, thus establishing a permanent program with a revolving fund.

"The paid scholarships will be awarded to those who have held loan-scholarships for two or more years and who make the necessary scholastic records."

This fund is similar to the Pendleton scholarship in that it requires the student to take a prescribed course of study. At the present time, there are no students enrolled at Clemson under the terms of this scholarship fund.

These textile concerns see the definite need for greater educational opportunities in the textile communities and have taken positive steps to raise the educational standards of the respective communities by establishing these scholarships. Not only are deserving students given the opportunity to get a college education, but also the students are encouraged to do much better work through competition for the scholarships.

GOVERNMENT SPINNING LABORATORY

(*Continued from page* 8)

"The variable speed drive permits the slashing of yarn at speeds ranging from approximately four to 23 yards per minute. Through the use of this speed drive, and a thermostat in the drying compartment, it is possible to obtain the degree of drying necessary for any count of yarn. The amount of sizing on the warp may be controlled within limits by varying the pressure on the squeeze rolls.

"A pre-determining revolution counter is mounted on the beam carriage for the purpose of stopping the machine when the desired yardage has been run into any beam section. This counter is a standard commercial product and may be set at the beginning of a warp so that the machine will stop when the desired yardage is on the beam. The counter is turned back to '0' yardage before starting to run yarn into any section of the beam . . . The machine has been used to slash samples as small as 1 1-4 pounds of 21s yarn, from which a sufficient quantity of cloth was woven for testing."

There are still many problems arising in the textile field which require extensive research work. In many of these problems, the Government laboratory and Mr. Cook will play a major part in the future.

A. A. Schneider, Textile Engineering senior from Patterson, New Jersey, perform the duties of a warp tender as he lays the warp ends into a special comb on the front of a warper.

J. B. Rhame (left) February graduate in Textile Engineering, learns from mechanic John Willis the proper method of lacing design cards for a Jacquard loom.

COTTON TEXTILE INDUSTRY

(*Continued from page 15*)

per cent of the nation's total and was consuming almost two million of the nation's nine and a half million bales of cotton. The state was second only to North Carolina in total cotton spindles in place and active spindle hours.

The importance to South Carolina of the cotton textile industry cannot be overestimated. Over fifteen per cent of all employed persons in the state are textile mill employees. Of persons employed in manufacturing concerns, two-thirds are textile workers.

There were 228 textile establishments in the state in 1939. All but eighteen of them were located in the Piedmont, where over ninety-six per cent of the textile workers are employed. The value of textile products was 273 million dollars, more than sixty-four per cent of the state's total for manufactured goods. Of this total, cotton broad woven goods alone amounted to 178 million and rayon broad woven goods to forty-three million dollars.

Spartanburg county ranks third in the nation in total spindles in place and is exceeded only by Gaston county, N. C., and Bristol county, Mass. Only Gaston consumes more cotton than Spartanburg, which in 1945 used 369,270 bales, 3.75% of the country's total. Anderson and Greenville counties are not far behind Spartanburg in these categories. Greenwood county, however, has the highest percentage of textile employees, with nearly one of every six persons in the county being employed in a textile plant.

During 1946, twenty-four new textile manufacturing plants and thirty new garment and sewing plants were established with an investment of almost three million dollars. The total for the state was seven and a quarter million dollars.

South Carolina's Piedmont section is now the center of the cotton textile industry in the United States and seems destined to remain as such for many years to come. The recent trend in establishing rayon mills and dyeing and finishing plants in this area will markedly increase the importance of this area to the textile industry.

Note: Most of the information for this article is taken from "The Growth and Distribution of Population in South Carolina", bulletin prepared by Julian J. Petty for the Research, Planning and Development Board, State of South Carolina, Columbia, S. C.

H. H. WILLIS

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IN THE
WOOD PRESERVING INDUSTRY

SPARTANBURG, - - SOUTH CAROLINA

TEXTILE OPPORTUNITIES

(*Continued from page* 13)

Knowles Loom Works, made a survey of their products in use. They found that 62 per cent of the looms were fifteen years old or older. During the ten years since 1937, new looms have not been on the market in sufficient quantity to supply the demand.

Now is the time when new manufacturing plants are being built and new machinery is being purchased. At this time, the woolen and worsted industry is looking for the most advantageous locations for their new plants. There are many reasons for their consideration of the South. Some of the facts for this consideration will be discussed.

The water supply of South Carolina is suitable for industrial purposes. There are four major drainage basins: Pee Dee Basin, Santee Basin, Edisto Basin, and Savannah Basin. The majority of the drainage areas are in South Carolina, and the water is generally soft with low mineral content. For many purposes no treatment is necessary prior to its use.

South Carolina offers a high rating of electric energy horsepower-per-workman. In 1940 the installed power of hydro-electric plants was approximately 80 per cent of the state's total installed power, in which the state was sixth in the nation. Electric power is a clean, efficient source of power—one which necessitates a minimum of dependability upon other sources of power. Federal Power Commission statistics show that typical industrial power bills in South Carolina are about 84 per cent of those in New England localities.

There is a slightly higher railroad rate on manufactured goods. At the present time this problem of rates is being discussed in Washington. Not only is South Carolina a convenient location for serving the increasing garment manufacturing industry, but it is also favorably located for the potential Latin American consumers.

Railroad shipping rates from the wool producing center of the United States to Boston and to Columbia, South Carolina, are the same. In normal times, more than 30 per cent of the raw wool for manufacturing in this country is shipped by water from Australia, Argentina, and the Union of South Africa. The port of Charleston is several hundred miles closer to these sources than are the Northern ports, and a water haul of about 70 miles would be offered to mills located on the upper shores of the Santee-Cooper basin.

The state is serviced by three large railroads with 6,164 miles of track. The paved highways are in excellent condition and cover over 6,550 miles. These highways are safe and suitable to carry heavy traffic to all parts of the state, and for inter-state travel. There are three deep-water ports suitable for receiving ocean going vessels, and they are connected with the intercoastal waterway. Three federal airlines schedule regular stops in South Carolina.

It may seem that, with the large amount of skilled cotton mill personnel in South Carolina, there would be a large supply of labor for woolen mills. It has been found in certain cases, however, that cotton mill workers do not do well in woolen and worsted processing because of the differences between the two manufacturing methods. It has been the experience of mills coming into this area that it is more desirable to train green labor. This would not mean a great loss of time and money because lower wages would be paid to the employees while learning. With increased efficiency, wages would be augmented, and production would grow. Graduates of Southern textile schools would be able to adapt themselves to this type of work almost as readily as they would to the cotton textile work because of their generalized training in the fundamentals of textile processing.

Based upon figures for the fiscal year 1940-1941, the average daily wage for textile workers in South Carolina was three cents above the average wage for all industries in the state. By comparison, in both the cotton and woolen industries, the average wage paid in 1942 by the Southern cotton and wool manufacturers was approximately 80 per cent of that of the Northern worker. Although there was a slightly lower value of product per man hour in the South, this was offset by the cheaper costs and the net value of products per man hour in the South was 27.5 per cent above that of the Northern states.

Pleasant labor relations have been found in the South by amiable management. The large majority of native born workers is one of the principal factors for these desirable labor relations. It can be said, without fear of contradiction, that industry will find dependable workers and harmonious labor conditions.

The climate gives several advantages to South Carolina in industrialization. The average yearly temperature for South Carolina is 63 degrees. It is a stimulating climate, having cool nights in the summer and warm days during the winter months. This would contribute to a reduction of absenteeism and a better general physical condition of the employees.

Building costs also are reduced because of the mild climate. Saving can be effected in the initial construction in items such as the roof and the depth of foundation. With relation to mill maintenance, the minimum of cold days and the absence of long cold spells influence the kind and amount of fuel used.

South Carolina is anxious to increase the development of the woolen and worsted industry of the state. With its many natural advantages over other regions, there is no reason why this industry can not be expanded to a much greater extent.

Note: Material for this article was obtained from "An Opportunity for the Woolen and Worsted Industry in South Carolina", a bulletin prepared for the Research, Planning and Development Board, State of South Carolina, Columbia, S. C.

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ANTIQUE EQUIPMENT PRESENTED

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This "combination textile machine", embodying the essentials of the cotton gin, opener, card, and drawing frame, receives field cotton (containing both seed and trash) on its short conveyor belt on top of the machine. The cotton is fed into a hopper where a miniature gin removes most of the seed and trash together with a considerable amount of cotton. The cotton is opened and then moved on to a small card. The small card sliver passes through miniature drafting rolls and is wound as a coarse yarn on small bobbins. The machine is so geared that all parts of the machine function merely by turning a single handle.

The machine is entirely hand-made, including the fluted steel roll and other metal parts. Its exact age is not known, but it is believed to have been made between 1800 and 1830. It is said that as little as a handful of raw cotton can be converted by the machine into a coarse yarn.

One small all-wooden spinning wheel was purchased by Mr. Humbert from a Blowing Rock, North Carolina, antique dealer. This spinning wheel is reputed to date back to 1790.

The all-wooden reel, or hanker, was made by hand in Oconee county "many years ago".

The model of the bale presser was made by a Mr. Miller of Abbeville county about 1830. The model is a reproduction of one of the earliest designed pressers.

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HUNT SPREADERS ALLOW HIGHER SPEEDS....GIVE GREATER STABILITY

WEAVING PRACTICES, including "Maintenance, Cleaning, and Bracing of Looms," occupied an important place on the program of the recent fall meeting of the Textile Operating Executives of Georgia; held in Atlanta, Oct. 12th.

Bracing, characterized by Hunt Spreaders, came in for generous praise. Figures gathered from operation of many mills, as reported in COTTON, November 1946, showed that:

"60-inch E-Model looms after bracing gave 104.8% efficiency compared with unbraced looms. Speed of the braced looms averaged 149 ppm. and regular looms 125 ppm. on the same test.

"Extra bearings were placed on looms in another mill, with a smoother running loom and less trouble resulting. The looms were not speeded, but were enabled to operate on heavier goods. This change on 40-inch E-Model looms, running 160 ppm. lowered seconds and increased the production without speeding.

"Other mills also reported lower maintenance costs, and smoother operating looms by bracing.

"Other experiences were related concerning 28-inch E-Models, 40-inch E-Models and 62-inch Model D looms. The 28-inch loom speed was increased from 147 to 176 ppm.; 40-inch from 143 to 167 ppm., and the 62-inch from 128 to 149 ppm. Tests indicated that the looms ran smooth enough at these speeds."

The foregoing reports from Georgia Textile Executives are typical. Other users of Hunt Spreaders from Maine to Texas say they get better cloth, higher production, reduced vibration, lower maintenance costs, and uniformly smoother performance in weave rooms.

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STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

VOL. 5 MAY, 1947 NO. 3

IN THIS ISSUE . . .

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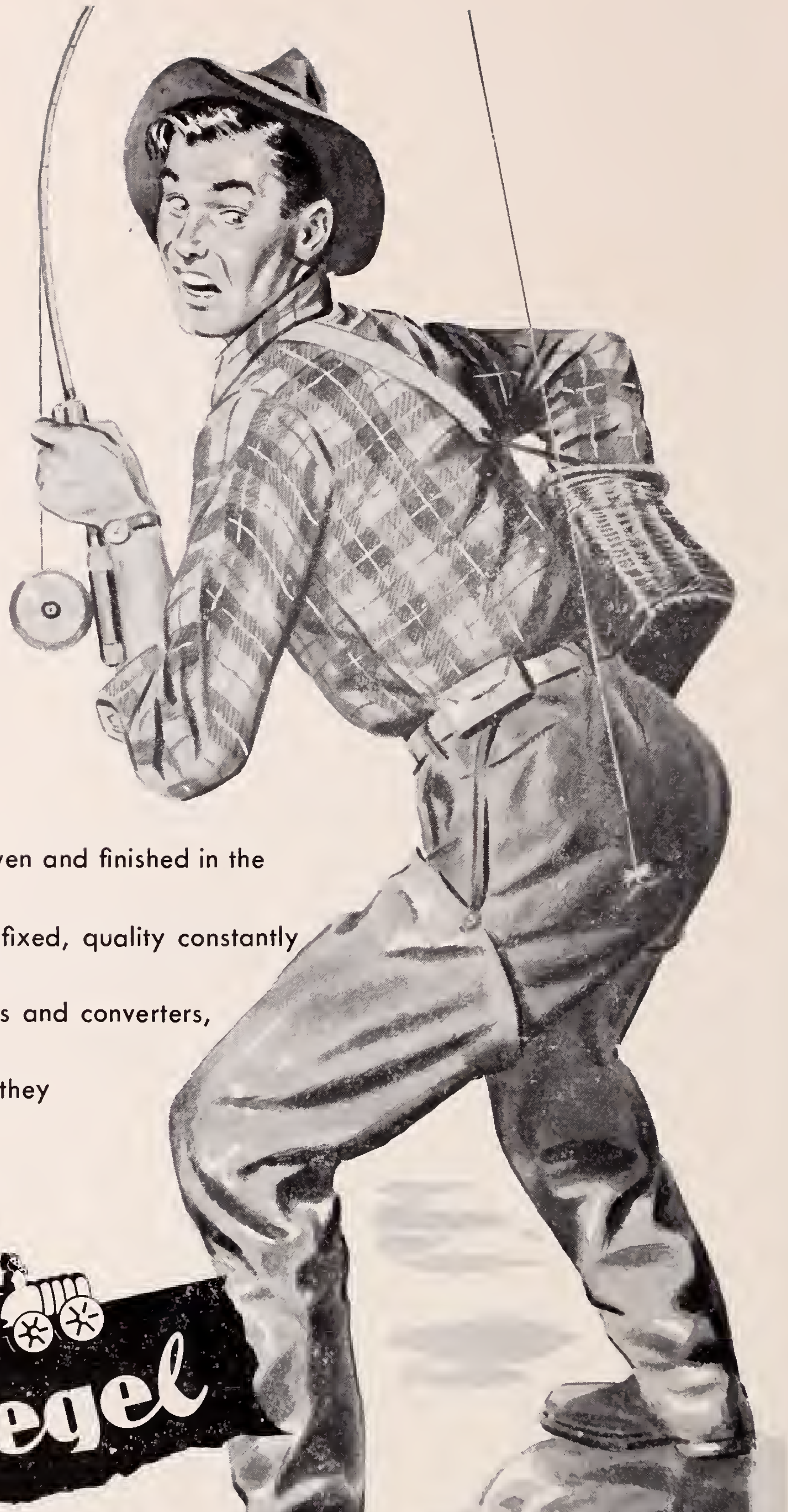

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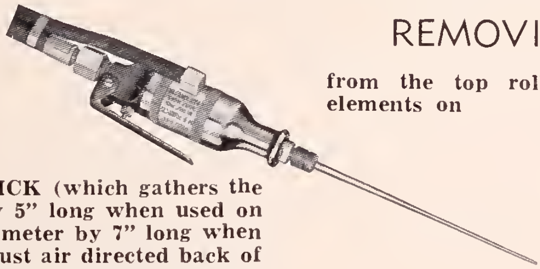

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The BOBBIN and BEAKER

Official Student Publication
Clemson Textile School

Vol. V MAY, 1947 No. 3

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The Bobbin and Beaker

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The views and opinions expressed in all guest articles are those of the writers themselves, and must not be construed to represent the views and opinions of the Editors of this magazine or of the Faculty of the Clemson College School of Textiles.

Finale—

With this issue, the senior members of the staff bid farewell to THE BOBBIN AND BEAKER.

During the current school year, we have succeeded in publishing three issues of the magazine. As amateur journalists we have worked hard to revive, after more than three years of inactivity, one of Clemson's three student magazines. Last fall we set out to do our part by bringing back on the scene another of the campus activities which were struck by the war. In doing this, we endeavored to put out a magazine worthy of the effort and worthy of the school. We hope that we have succeeded.

No, it has not been an enviable task. Trying to rally the necessary student support was not easy. Holdover war-time conditions hampered us often. We have been criticized, though not too unjustly. These and other problems caused us no small measure of consternation. Yet despite them we felt justified in resuming publication of the suspended journal, and we feel that the continuation of the magazine will be worth whatever difficulties are encountered and the amount of work involved.

Throughout the year, we have been accorded the splendid support of all—of textile and other organizations, of textile manufacturers and suppliers, and of the textile school faculty, students, alumni and friends. We are ever grateful for their cooperation and frequent words of encouragement. We regret only that we leave the new staff so deeply indebted to so many people for their generous help and guidance.

In this issue, we are especially grateful to Mr. Ernest Stewart, Public Relations Manager of the National Cotton Council of America; Lt. Col. Harold S. Tate; Mr. Charles K. Everett, Director of Merchandising, The Cotton-Textile Institute, Inc.; Dr. S. J. Kennedy of the Military Planning Division, Office of the Quartermaster General; Mr. Robert H. Chapman, President of the J. E. Sirrine Textile Foundation; Professor L. R. Booker; Mr. L. O. Hammett; and Mr. James W. Bradbury, A. M. Pullen and Co.

For past assistance, we thank Dr. Claudius T. Murchison, President, and Mr. John W. Murray, Editorial Director, The Cotton-Textile Institute, Inc.; Dr. James E. Ward; Dr. Robert F. Poole, President of Clemson College; Dr. Donald G. C. Hare of the Deering Milliken Research Trust; Mr. J. M. Cook of the USDA Government Spinning Laboratory; Mr. H. E. Glenn of the Research, Planning and Development Board, State of South Carolina; and Professor Joseph Lindsay, Jr.

We appreciate the ever-willing assistance of Dean Hugh M. Brown, Mr. John T. Wigington, Director of the Cotton Textile Institute's Division of Technical Service, Professors R. K. Eaton and D. P. Thomson, Miss Pauline Cannon and Mrs. Elsie B. Breazeale. Special thanks are due our advertisers for their generous support. Also we thank the many textile students who gave willingly of their time and energy to make publication possible.

We leave the magazine in good hands, and we are fully confident that through the combined efforts and abilities of the new staff a better magazine will emerge during the next school year. If they receive the same wholehearted support and spirit of cooperation extended to us, their tasks, too, will be pleasant ones.

Reluctantly we give up the reins of THE BOBBIN AND BEAKER. We have learned much, worried a little, and enjoyed doing it. May the new staff do as much, and may success be theirs.

New Staff—

Harold R. Valerius, Jr., Textile Engineering junior from St. Louis, Missouri, was recently named Editor of THE BOBBIN AND BEAKER for the year 1947-48. During the past year, he served as Associate Editor and now succeeds William E. Broadwell.

Other members of the recently chosen staff are A. M. Hand, Textile Chemistry junior from Hardeeville, succeeding James K. Waits as Managing Editor; and Richard C. Hendrix, Textile Engineering junior from Greenville, succeeding Ernest T. McIlwain as Business Manager.

Announcement of appointments to other positions will be made by Editor Valerius at the beginning of the fall semester. All textile students who desire to work on the magazine are requested to contact a member of the new staff.

Record Enrollment—

Enrollment in the Clemson College School of Textiles reached an all-time peak when 537 regular students registered for textile courses in February. This is an increase of 45 students over the previous record number enrolled in September.

By courses, there are 277 students enrolled in Textile Manufacturing, 219 in Textile Engineering, and 43 in Textile Chemistry. By classes, there are 173 freshmen, 174 sophomores, 107 juniors and 83 seniors. Several post graduate students are not included in the count.

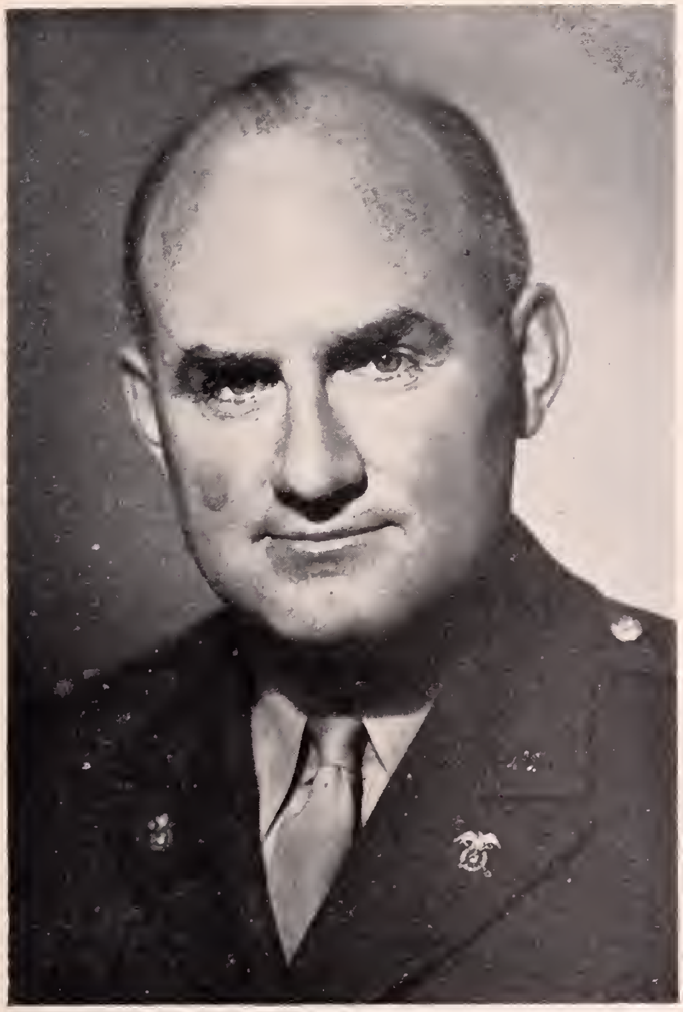
Slightly more than 17 per cent of Clemson's 3123 students are enrolled in the School of Textiles.

Cost Meetings Held—

A series of meetings, sponsored by the Cotton-Textile Institute, was recently held for the purpose of discussing adequate cost methods and the application of scientific cost finding principles to current mill operations. The meetings, which were under the direction of Lewis F. Sawyer, Institute industrial accountant, were held May 5 in the Clemson Textile School, May 6 at the Oregon Hotel, Greenwood, and May 7 at the Cleveland Hotel, Spartanburg.

John T. Wigington, Institute Director of Technical Research, reviewed the technical services offered by the Institute.

The discussions also included income tax procedure, last-in first-out inventory, and Section 722 of the Internal Revenue Act.



PHOTOGRAPH BY BACHRACH

GUEST EDITORIAL

Ultimate Aims

Dr. Kennedy received his education at the University of Illinois and Columbia University. After fourteen years' experience in the merchandizing of textiles during part of which he was Director of Market Research for Pacific Mills, New York, he served with the War Production Board in the Textile Bureau early in the war. Since 1942, he has been in charge of all textile research undertaken by the Quartermaster Corps. As part of his duties he was the steering member of the Textiles Subcommittee of the Technical Industrial Intelligence Committee which sent textile observers to Germany for the collection of technical and research data relating to every phase of the German textile industries. He is at present Research Director for Textiles, Clothing and Footwear in the Research and Development Branch, Office of The Quartermaster General. He is the author of "Profits and Losses in Textiles" and co-author of "Textile Markets."

By Dr. Stephen J. Kennedy
Research and Development Branch
Office of the Quartermaster General

To every person there comes some day a clear conception of ultimate aims. To a fortunate few it comes in college, when objectives no longer appear in terms of a job by which to exist, but as a way of life around which to shape one's world.

Those who aspire to managerial responsibilities in the textile industry need early to conceive objectives over and above the operation of machines and the sale of goods. This industry which has been characterized for over a century by tradition in production and merchandizing is undergoing changes that are real. In the turmoil and reshuffling that is ahead for the period in which today's students will come into maturity and responsibility, men will be needed who hold ultimate life aims with a strong controlling sense of validity, that will stand up under the ruthless criticism of reflective thinking.

Nowhere is the need greater for clear vision than in the appraisal of one's qualifications for creative work as compared with less exacting routine tasks or work based largely on human contacts. Many people with aptitude for engineering possess traits, whether by inheritance or development, that will not be satisfied unless provided an outlet in creative work or thinking.

To such, research offers high awards. These men are the successors to yesterday's pioneers, pressing today against the frontiers of what is known and probing beyond. For any individual to reach that point where he can look over the edge, there must be long periods of assembling the mental and laboratory tools with which to work.

Research, however, is not magic. Occasionally a discovery is the result of sheer luck, but mostly new discoveries are the result of keen perception, clear thinking and bringing to bear a very considerable fund of knowledge that is well organized and deftly handled. In the greater specialization that must occur as our fields of knowledge spread ever wider, great acheivement will increasingly come only from teamwork in a well-led research group.

It has been often said that there is a great need in the textile industry for research. Unfortunately, wide evidence is lacking that the real significance of that statement is fully appreciated. Let it be hoped that the managers of tomorrow will have a clear understanding that research, like our system of free enterprise, can have only one valid purpose; to provide the people with the best possible goods at the lowest possible price, and thereby to create the highest possible standard of living for all.

Such an ultimate aim creates the kind of confidence and sense of significance which alone can bring enduring satisfaction to living.

The Japanese Textile Industry Moves Toward Recovery

By

Lt. Col. Harold S. Tate,

Textile Division, Economic and Scientific Secton, General Headquarters, Supreme Commander for the Allied Powers

Colonel Tate, a native of Abbeville, South Carolina, is a 1925 Textile Industrial Education graduate of Clemson College. He received his M. A. degree from Columbia University in 1929.

For fifteen years Colonel Tate was Head of the Textile Industrial Education Department of the School of Vocational Education at Clemson. He was placed on military leave from this position when he went on active duty with the Army in 1941. He served first as Battalion Executive Officer with the 24th Infantry at Fort Benning and overseas in New Hebrides, and later as Provost Marshal on the Staff of III Island Command in New Hebrides.

Colonel Tate received training in Military Government and Civil Affairs at the University of Virginia and University of Chicago. Since October 1945, he has been in charge of Textiles on the Staff of the Supreme Commander for the Allied Powers in Japan.

The extent to which the Japanese textile industry has recovered from the virtual paralysis from which it suffered immediately after the end of the war has been one of the brightest spots in this country's industrial picture during the first year and a half of the Occupation. While production is still far below pre-war levels and far below the minimum levels which SCAP (Supreme Commander for the Allied Powers) deems necessary to support the "normal" domestic economy, still the gains made in 18 months have been most significant.

The textile mills comprise Japan's largest single industry in all of its ramifications, involving imports, exports, financing, machinery manufacture, and other related phases. It provides employment for a large segment of the country's population and contributes in other respects to the economic life of the nation.

Recognizing this, General Headquarters here ordered the Japanese government to take all necessary steps to rehabilitate this vital industry in one of the first directives issued immediately after the beginning of the Occupation.

During the war, the textile industry was neglected in Japan. 9,000,000 spindles and complementary equipment, as well as tens of thousands of looms were scrapped for their metal content so that the Japanese war machine could be supplied with metals. Parallel developments took place in the other textile industries.

What was allowed to remain was devoted primarily to the service of the Japanese military forces. At the end of the war, the textile industry had a considerable stock pile of wool, a

The remains of a Japanese plant that burned completely; however the machinery inside still stands. The rubble has been cleared away from the building site on the left, leaving the bare concrete foundations.

small quantity of cotton, and other materials which were earmarked for military use. These were by order of SCAP, turned over by the Japanese government to the mills for the manufacture of civilian goods. SCAP saw an immediate need to supply the minimum quantity of consumer textiles necessary to prevent disease and unrest in the country, as well as important industrial materials for the production of other consumer articles.

As is well known, the first concrete development in the raw material situation was the importation of 890,000 bales of surplus American raw cotton into Japan for the dual purpose of providing exports for the war ravaged areas of the Pacific and to augment the dwindling supply in Japan. As a result, production increased rapidly after the middle of 1946. In the last quarter of 1946, output was maintained at an annual equivalent rate of 259,000,000 pounds of yarn, compared with a rate barely one-tenth of that in the first quarter of the year. There is still much to be accomplished. SCAP's goal is an industry of four million spindles producing up to eight hundred million pounds of yarn a year.

The raw silk industry has quintupled its production as compared with the first few months of the Occupation. The last quarter of 1946 the production rate was approximately 50 per cent of SCAP's ultimate goal.

The picture is less bright in the woolen industries and in rayon, which were operating during the last quarter of 1946 at about 25 per cent and 10 per cent, respectively, of the annual rates of output which SCAP deems desirable for the maintenance of a normal economy in this country.

Close-up view of part of the machinery of a bombed-out bleaching plant.

These two young Japanese are full-time oilers. The boy at the left wears the cotton "tabi" sandal while the other wears the wooden "geta."

Our problems in these two cases are primarily raw materials. Japan depends on imported raw wool, and the stock pile is approaching exhaustion now. The rayon industry must have imported salt.

While these two industries are lagging, I am safe in saying that prospects are bright for considerable increase in production during the latter part of this year. It is difficult for one outside of Japan to appreciate the problems which beset us in our efforts to guide Japan's textile industry along lines which are considered desirable by the Supreme Commander. Even such routine administrative matters as communications form an obstacle rather than an aid to efficient operation of the industry, from the Japanese point of view. It has been a year's work to convince Japanese government officials thoroughly that the textile industry will be a mainstay of their economy, and should be encouraged. During the war, the textile industry had been looked down on as strictly a peace-time enterprise and they could not at first get this feeling out of their minds. The very agencies of the Japanese government have shown a commendable desire to stimulate the activity of the textile industry. This development serves to strengthen my feeling of optimism for the future.

William G. Blair

Textile Production in the Land of Arabian Nights

By H. R. Valerius, Jr.

The two extremes of textile manufacturing are well known to Professor William G. Blair, Clemson Textile School. Professor Blair, who is an authority on the modern production of textiles in this country, had an opportunity to observe primitive textile manufacturing while on a recent trip to the Kingdom of Yemen with the United States diplomatic expedition, headed by Colonel William A. Eddy. This expedition was made at the request of Imam Yahya, 76 year old ruler of that country. This diplomatic mission consisted of twelve men which included three medical men, two radio experts, and several members of the State Department, in addition to Professor Blair.

After a diplomatic treaty was negotiated and signed, the Minister of Public Health had a discussion with the American doctors regarding the medical needs of the Yemen. The radio technicians consulted with the Minister of Communications concerning the installation of wireless equipment. Professor Blair, the textile member, laid out a plan for a proposed cotton manufacturing industry while having discussions with Prince Huessein and Yemen's Prime Minister.

A delegation from Yemen is expected to visit Washington sometime this spring or summer to complete the above discussions and to purchase machinery and supplies for the Kingdom of Yemen.

Yemen is one of the few absolute monarchies existing in the world today. It is situated next to Saudi Arabia, which has the much publicized oil lands, on the southwestern part of the Arabian Peninsula in the same locale as the colorful Arabian Nights stories. Yemen has a population of about 3,500,000 and encompasses an area of 75 thousand square miles. In the November 18, 1946, issue LIFE MAGAZINE reported that Yemen had signed treaties with Great Britain and Russia. This is unique in that nation's history, because of their centuries of isolation.

This policy of isolation is comparatively easy to maintain. Because of the great expanse of desert, it is possible to restrict travel. Undesirable people are not subject to brutal treatment but are deported. They are very hospitable to their friends, and extend every kindness to their welcomed visitor. The Iman had his chief chef do the cooking for the expedition while they were in the capital; he also assigned soldiers for protection and an official government representative to the party while they were traveling. Approximately a hundred white people had been in Yemen previously, and Professor Blair was about the 35th white man to enter the capital city of Sana'a (pronounced Sanar).

The textile industry, which has not made much progress since the middle ages, because of the long period of isolation, is indicative of the industrial progress of that country. The textile industry is principally carried on to provide enployment for the people. Weaving and dyeing are the only phases of the textile industry being carried on at the present time.

In one small town weaving was being done in a shack, by a man sitting on the ground with his feet in a hole, and working treadles to change the harness with his feet. The warp runs over what would correspond to a whip roll and rocks are tied to the ends of the warp so that the force of gravity on certain sized rocks gives the proper tension.

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The National Cotton Council

By Ernest Stewart
Public Relations Manager
National Cotton Council

The American cotton industry today stands united as it enters the greatest battle for markets in its history.

Cotton farmers, ginners, warehousemen, merchants, crushers and spinners have joined hands in a united program to reach the common goal of all— increased cotton consumption.

The first great step toward unity was achieved in May, 1938, when at a meeting of the Delta Council at Cleveland, Mississippi, a group of industry leaders laid the groundwork for the organization of a National Cotton Council of America. This initial group was made up of producers, ginners, warehousemen, merchants and crushers.

The second great step came with the admission into membership of the Southern cotton spinners at the Council's annual meeting at Augusta, Georgia, in January, 1941.

Today the policy and operations of this only organization representing all of the component parts of the cotton industry are determined equally by the elected representatives of each branch. From the outset, the National Cotton Council has concerned itself only with those projects and programs designed to increase cotton and cottonseed markets.

Cotton's battle for markets, the Council recognizes, is the same as that for any other indusry. The first essential has been that of unifying and organizing the vast manpower and financial resources of the far-flung cotton industry.

Cotton means fifteen million people, two and a half billion dollars of annual income, and seven and a half billion dollars in capital investment. None of cotton's competitors can boast these staggering totals.

Actually it is the tremendous expanse of the cotton industry which has made organization necessary. Two million cotton farm families, each fighting individually, have no chance against a few giant corporations whch control the synthetics industry. No more so have the individual spinners, ginners, or warehousemen.

Throughout its entire framework, the cotton industry is made up of individuals and relatively small firms who are not in a position, separately, to fight for the great markets on which their future depends. Only through organization of effort and pooling of funds can they achieve the irresistible power which the aggregate of their resources makes possible and which today's battle of fibers makes imperative.

Having united and having begun a continuing campaign for ever greater unity, cotton vigorously is pushing ahead toward the attainment of three major goals.

The first of cotton's goals is the improvement of the quality of the fiber itself and of end products through research.

Secondly, cotton is seeking to reduce costs through increased efficiency.

And third, cotton is endeavoring to increase its volume of sales promotion and merchandising.

The cotton industry realizes that the degree of its attainments in these three basic fields will govern its future success and prosperity.

In each of the three basic fields the industry is making definite progress, tackling some aspects of the problems as individuals and others through its central organization, the National Cotton Council.

Although cotton has lagged behind many of its competitors in the field of research, it still stands out above all competitors in its tremendous versatility and adaptability. Certainly no other fiber, and no other competitor, with the single exception of foreign cotton, can substitute for Amercan cotton in all its markets or in all its uses.

Cotton stands far out in front as the world's most adaptable, comfortable, washable fiber. Cotton isn't clammy. It doesn't crawl and it doesn't creep. Its seams don't slip; it doesn't stretch out of shape; and it doesn't require a set of ten instructions for washing. No other fiber can be woven so tightly to assure wind resistance in winter, and none absorbs and evaporates perspiration so effectively in summer. No other fiber is used in some form by every citizen of this nation, every hour of every day and every night, from cradle to grave.

To maintain the supremacy in the fiber field which these qualities have given it, cotton today is on the verge of great expansions in its research program. The Agricultural Research and Marketing Act of 1946, recognized by many as the most important piece of farm legislation ever enacted, authorizes the appropriation by Congress of up to $61 million annually, after five years, for farm research. Cotton's share of this fund probably would be about $20 million, or an adequate amount to give cotton parity in research with its competitors.

That cotton can expect rapid advances from an enlarger research program is proved by some of the results which have been achieved through research effort already in progress.

A new cotton insulation material, which is fully flameproof, is superior in insulating efficiency to any of the other ten most widely used types of commercial insulation. Unspun and unwoven cotton fabrics suitable for disposal napkins, towels, and diapers; fire-retardent fabrics; durable, boardlike cotton plastic laminates—all demonstrate what can be expected if cotton research is broadened.

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The Relations of Art to the Textile Designer

By A. E. McKenna
Professor of Weaving & Designing
Clemson Textile School

Decoration and color have been the principal requisites of practically all fabrics through the ages. This is shown by the beautiful historic fabrics now reposing in museums throughout the world, and which mark various stages of art development. In the early history of woven fabrics, designers and weavers were for the most part one and the same person. However, the growth of civilizations, the machine age, and modern developments have altered the requirements of the textile designer.

Richard Glazier in his book, "Historic Textile Fabrics," comments on the evolution of pattern as follows:

> Pattern undoubtedly arose from a desire, or necessity, for some symbol or emblem, significant of power, life or association.

Evidences of art have been discovered as far back as the Stone Age, thus showing that design is an integral part of human existence. The inhabitants of the earth in his prehistoric period expressed their ideas on mats, baskets, nets, and rude fabrics made by interlacing various wild grasses and skins of animals. Geometrical figures and conventionalized animal forms were perfect in proportion and well-designed in regard to color and detail arrangement.

The birth of Egyptian art marked the beginning of great racial expression in design. From this period, there were continuous developments in art; each new civilization contributing its own symbols and decorations. Thus we have the historic art of Greece, Persia, China, Japan, Italy, Spain, France, England, and other countries. Great revivals of art endeavor; such as, the Italian Renaissance and the Frence Renaissance, produced new textile motifs and decorative features. In these periods of great racial expression, famous artists designed fabrics which were subsequently woven by highly skilled weavers. Garnet Warren in his book, "The Romance of Design," comments as follows:

> In these renascent times, indeed, the textile art and particularly textile design were coming to a glowing and high estate. Artists whose genius breathed into immortal canvasses themselves made designs for rich damasks and silks and tapestries.

The introduction of machines into the textile industry in the beginning of the eigteenth century practically stopped the developopment of racial art. Designers were unable to keep up with quantity production and as a result produced new patterns by adapting and modifying designs in historic fabrics. The development of machinery was considerably retarded by the antagonism of the hand loom weavers. In France, a great deal of disturbance was caused by the invention of the jacquard machine which has made it possible to weave intricate patterns in volume with ease and accuracy. It is interesting to note that this machine is being used today without having been materially changed in construction. However, France did not succomb so completely to the machine age as other nations and did not subordinate the designer to the technical expert and production manager. While the craze for quantity production of mediocre fabrics was sweeping the world, French designers and weavers continued to produce goods of beautiful texture and design. France established art schools and museums to aid in this work and insure a continuance of the artistic quality of the nation.

The first mills in America produced only yarn and coarse plain fabrics. However, as the textile business advanced in the United States, fine-goods mills were erected in New England which produced colored and decorated fabrics. But, in the main,

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The Textile Industry and Time Study

by
James W. Bradbury
Manager, Engineering Department
A. M. Pullen & Company

The textile industry offers a wide field of opportunity for the time study engineer.

Every textile plant in the country should have time study engineers to set methods and standards for the purpose of keeping their labor cost in line with competition.

Wages in the textile industry today are higher than they have been since World War I. Ahead, lies the greatest era of competition and, along with the rest of the industrial world, the textile manufacturers must be prepared to meet it.

Wages are high, the cost of cotton and materials has risen considerably and now, as never before, huge sums of money must be spent to replace old and worn out machinery, for the purchase of new machinery, and for expansion. All these factors result in a tremendous cost for operating a plant.

In order to meet competition, the textile plants will have to operate at the highest efficiency, obtaining maximum production, to keep the cost at a mimimum.

Wages should not be lowered to reduce cost. The problem before the textile manufacturer is, therefore, how to operate at a lower cost wihout lowering wages. The answer to this problem is, first of all, scientific time study and modern high productive labor-saving machinery.

Time study is a method for determining, scientifically, what constitutes fair labor standards, and is the only accurate method for setting piece rates. No plant can hope to achieve the maximum efficiency and minimum cost without having all the employees on normal job assignments and paid on a piece-rate basis.

Through the aid of time and motion study, the way is opened toward the elimination of wasteful time and energy which means high cost to the employer and discontentment and loss of wages to the employee.

The textile student should make certain that his educational background includes a complete knowledge and understanding of time and motion study, then devote an apprenticeship to this type of work, for its broad scope embraces many phases of manufacturing problems. It trains him to be keenly observant, quick thinking and gives him a clear picture of the tasks before him and the best method for accomplishing these tasks whether they pertain to quality production, labor problems, property and machine maintenance, accident hazard, cost, lost motion or planning and efficiency. There isn't any better way for a textile student to obtain experience.

A textile operator is one of the most difficult types of operators to time study as his duties require many different kinds of motions to perform each job, and the element timings are small compared to jobs in other industries. There are many different ways in which the operator can perform most of the elements and there are wide variations in the time recorded for each kind of element.

Most of the job frequencies performed by a textile operator vary from hour to hour so that it is extremely difficult for any person, without textile engineering education or textile experience, to set up a job assignment without the help of the overseers and superintendent in the plant.

The essential duty of a person making a time study is to rate the performance of the operator as all performances must later be converted to normal before they become a standard. A standard performance indicates a normal rate of speed at which an operator can perform specific duties. It is possible for one operator to do a certain performance faster than another operator but, by rating the performance, both operators are placed on a relatively equal basis.

A time study that is not rated is of no value for determining a normal job assignment for an employee or group of employees. Therefore, it is very important that the plant owner or manager employ someone thoroughly trained in time and motion study to set his job standards and figure his piece rates.

In the general run of textile plants, very little has been done up to the present time in the way of promoting better labor relations. The time study engineer, in his line of duty, does much toward improving relations between labor and management. His honesty, tact, and diplomacy with a sense of fairness give the employees confidence in him and in their employer. The proper instructions to new help, beginners, and old employees with regard to new job standards, piece rates and mill policies do much to promote a better personnel on the job.

Every manager and supervisor of a plant should have some knowledge of time and motion study. It would aid him to know the most advantageous layout for his machinery, the kind of servicing equipment best suited for the worker, the many labor-saving devices, the elimination of unnecessary steps, lost motion and how to improve working conditions in his plant, making it a cleaner and better place for his employees to work in. He would also be in a better position to handle his labor problems which arise from day to day.

There is a great future for both the textile industry and time study. The textile student can indeed look forward to a wonderful future.

National Cotton Week

By Charles K. Everett
Director of Merchandsing
The Cotton-Textile Institute, Inc.

National Cotton Week's observance this year—May 19-24—is aimed at the original and time-honored objective of marshalling America's selling forces behind cotton textiles. The circumstances necessitating through the war years a shift in emphasis away from that merchandising aim have now happily given way to a situation in which shortages are being steadily corrected by an ever-expanding volume of cotton textile production at the mill level. Many items that normally figured in a conspicuous way in Cotton Week store promotions in the past will again be available in quantities to obviate the need for allocations and allotments to individual customers.

Actually production of cotton textiles is now running at the highest peacetime rate in the industry's history. Beginning with April, 1946, every subsequent month shows a successive increase in over-all production. At the present time mills are turning out cloth at the rate of 10 1-2 billion yards per annum. This compares with a previous peacetime peak of less than 9 1-2 billion yards in 1937 and even more sharply contrasts with a normal pre-war year of about 6 1-2 billion yards. There is nothing in sight to indicate a recession in this record-breaking rate of mill activity.

Through the war personal wardrobes became badly depleted with the result than many items such as white shirts, underwear, diapers, and various work clothing articles are still being sought with considerable clamor. The complete elimination of those shortages is taking longer than first anticipated because retail sales continue so brisk that stores have found it difficult to build up regular working stocks. A continuing flow of fabrics for those items, however, is constantly narrowing the spread between normal and abnormal inventory replacements.

Consumer demand for the last nine months has demonstrated that cotton is continually gaining ground in the women's fashion field. Special promotions of cotton street and sportswear and of utility garments, too, are again being restored by retailers to their spring and summer merchandising calendars. Now that Government regulations no longer restrict the output of novelty merchandise better assortments of goods heighten the sales appeal of these special events. It is noteworthy, too, that from winter resorts of the South come highly encouraging reports on the consumer acceptance of summer type cottons.

This observation has its application to men's apparel as well as in the case of women's wear. Men's cotton slacks and sports shirts are again coming into their own even though available supplies this spring will probably be too short for fully satisfying consumer demand. On the beaches, at the races, and elsewhere in indulgence of leisure time at the Southern resorts cottons are an important part of every picture that mirror from Southern resorts the popular favor of cotton next summer for men and women.

With the expansion of housing construction which promises to gain notable momentum this spring, the demand for cotton home furnishings will probably become very marked and, moreover, will undoubtedly continue long after retail activity in apparel items returns to a more normal basis. New housing in any community represents for stores increased business in sheets, towels, upholstery fabrics, curtains, draperies, carpets and other decorative items. The prospect of increased availability of new homes for occupancy this year gives added impetus to sustaining consumer interest in cotton home furnishings of all types.

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Textile Education in South Carolina

By L. R. Booker
State Teacher Trainer
Trade and Industrial Education

A number of years ago, I was in the office of a successful mill superintendent and he showed me an old photograph of a group of fourteen young men, which had been made at Piedmont in the early 1900's. It was a photograph of a class these young men had organized in mathematics. This group had obtained the services of one of the ministers in the community as teacher and had paid the cost of the instruction by digging into their jeans. Twelve of the fourteen men in that photograph had become mill superintendents, one a judge of probate court, and one a minister. Certainly, no class anywhere, could be any more successful than that one.

The man in the textile plant has for many years realized the need for and the value of an education. At one time, it was amazing the number of mill managers, superintendents, and overseers in South Carolina that started working in the textile plants at Piedmont or Pelzer. Those two mills were among the earliest of the large mills in the State and both served as training grounds for other mills erected later. The point, however, is that there were men in those plants ready and capable of taking positions of more responsibility. These men were capable because they came from the intelligent rural labor market available around Piedmont and Pelzer, as well as around other mills, and some guiding spirit among them stirred enough interest to organize night classes, which the more ambitious attended.

Those early classes of textile night classes consisted almost entirely of mathematics, and the content of the course seldom, if ever, went beyond ratio and proportion or square root. In those days, as is done today, the man in the plant saw the need for a thorough knowledge of mathematics as a stepping stone to a better job and more pay. The practical side of a job was learned on the job, and learned well. The technical aspects of textile processes were learned by observation, some experimentation when no one was looking, by discussing things with one another, and by reading everything pertaining to textiles that came their way.

In the meantime, Clemson College had erected a textile building in 1898, and was offering majors in several phases of the textile industry. The enrollment in the Clemson Textile Department was normal, whch meant that relatively few were graduated a year. The graduates were not welcomed with open arms by the mills. Many mills did not particularly care to have them. Graduates were employed at the regular rate of pay of other workers, or at a rate very little above, except in special cases. Once employed, the college-trained men aroused some suspicion of the older workers, who thought of him in terms of a person working him out of a job. The college-trained man in a textile plant prior to World War I had to prove his mettle by working all kinds of mathematical problems given him by the different overseers and the master mechanics, and often enough, had to be handy with his fist, to prove to the younger men in the plant that he could take care of himself physically as well as mentally.

The textile industry began to come out of the depression in 1937, and the demand for trained workers became acute. Many mills became research minded and young trained technicians were sought to make time and motion studies, to operate testing departments, and to study methods of improving machines, the processes, and many other factors important in efficient operation. Science had come to the textile indusry. In 1938, Clemson College built a magnificent textile plant for training technicians and other type men for the textile industry. High schools that had discontinued textiles during the depression years, again added it to the high school curriculum. Other schools added it as a course. By the time the United States entered World War II, eleven high schools had well equipped textile departments with all machines that the ordinary mill uses except pickers and slashers.

All educational work has not been done by the high schools or the evening programs operated under the Smith-Hughes and supplementary federal acts. A number of mills, namely Graniteville Manufacturing Company, at Graniteville, have conducted their own training programs by setting up a miniature mill within the mill itself. For a number of years, the United States Rubber Company Mill at Winnsboro had an apprenticeship program as did the Kendall Mill group in the state. The apprenticeship program took college men and high type non-college men and routed them from department to department throught the mill for a year or longer. Upon completion of the apprenticeship program an individual could choose the department in which he wished to remain.

The Southern Textile Association organized about 1924, which is an assocation of superintendents, overseers and second hands, has done considerable educational work by its quarterly meetings and discussions relating to production and human welfare in the mill. Likewise, the Arkwrights, whose membership is composed of men who have made an original research of a textile problems and presented an acceptable paper on it to the organization, has contributed to the development of a scientific

(*See Page* 18)

J. E. Sirrine

The J. E. Sirrine Textile Foundation

By Robert H. Chapman

President

The J. E. Sirrine Textile Foundation is an eleemosynary organization founded by the textile executives of South Carolina in honor of our great textile engineer and leader, Dr. Joseph E. Sirrine, of Greenville, S. C.

Its purpose is primarily that of fostering textile education, encouraging the development of more sound educational bases for the future supervisory forces of the textile industry in South Carolina.

While its operations are not necessarily so confined, it is expected that at the outset at least most of its efforts will be confined to the building of a bigger and better staff of teachers in the textile school at Clemson College, S. C.

The assumption is that under political limitations Clemson College may be and frequently is prohibited from building a staff of teachers who can compete effectively with the teachers in the textile schools elsewhere.

The J. E. Sirrene Textile Foundation proposes to overcome this difficulty so as to enable Clemson College to attract the most capable men in the field.

The foundaion would also be quite naturally concerned with the equipment of the Clemson College Textile School and would probably undertake to assist the College in securing the very best of equipment to enable the faculty to do an oustanding job of education.

Research is not forbidden in the program of the foundation, but it is not anticipated that the foundation will concern itself with research, except in the field of textile education. All other types of research will be left to the many other foundations and agencies which are operating in those fields.

Fundamentally the objective of the foundation is better textile education and its contributions will be directed toward that end with Clemson College Textile School receiving the first attention.

The foundation has an endowment of over eight hundred and thirty thousand ($830,000.00) dollars. It is supported by most of the textile interests operating in South Carolina or affiliated with them.

The foundation will spend the income from this endowment and will from time to time use a portion of the corpus of the endowment if found necessary.

The foundation is now about ready to function.

The officers and members of its board are as follws:

J. E. Sirrine, Chairman of the Board
Robert H. Chapman, President
R. W. Arrington, Vice-President
John K. Cauthen, Secretary and Treasurer
W. S. Montgomery
W. A. L. Sibley
B. F. Hagood
R. E. Henry
S. H. Lander
W. H. Beattie
W. P. Jacobs
S. H. Swint
C. B. Hayes
C. B. Nichols
G. M. Wright
L. O. Hammett

PHI PSI

Pictured is the largest group of leading textile students ever admitted to membership in Iota Chapter of Phi Psi Fraternity. Left to right, front row—L. P. Batson, Jr., R. H. King, W. S. Quinn, E. Blakely, Jr., L. W. Thompson, F. E. Glenn, A. E. Punaro, R H. France, C. T. Cockrell; back row—J. G. Farrell, Jr., H. B. Turner, H. M. Miller, C. H. Glenn, J. H. Walker III, Professor T A. Hendricks, J. W. Kimman, Professor W. E. Tarrant, R. C. Hendrix, and R. P. Wilson.

NEW MEMBERS

Seventeen outstanding textile students became active members of Iota Chapter on March 27. This was the largest class of initiates in the twenty-year history of the local chapter. Professors William E. Tarrant and Thomas A. Hendricks were also admitted into the chapter. The informal initiation period extended from March 18, when Chapter President E. T. McIlwain administered the first and second degrees to the candidates, until March 27, when Acting President W D. "Chip" Clark officially declared them members after the third degree ceremony.

One outstanding sophomore, H. M. Miller, was admitted; other initiates were members of the junior and senior classes.

Professor William E. Tarrant, recent Phi Psi, initiate, quizes other prospective members during the initiation period. Old members of the Fraternity look on.

OFFICERS 1947-48

R. B. Willey, Textile Engineering senior from Greenville, was elected on April 17 to succeed E. T. McIlwain as President of the chapter.

Other officers elected at that time were J. H. Walker, Textile Engineering junior from Griffin, Georgia, succeeding W. D. Clark as Vice-President; H. M. Miller, Textile Manufacturing sophomore from Chester, succeeding J. R. Clark as Secretary-Treasurer; L. P. Batson, Jr., Textile Engineering junior from Greenville, assuming the new office of Corresponding Secretary; R. H. King, Textile Engineering senior from Lancaster, succeeding L. S. Croxton as Senior Warden; and J. F. Webster, Textile Engineering senior from Greenville, succeeding W. E. Broadwell as Junior Warden.

BANQUET

The twentieth anniversary of the chartering of Iota Chapter was observed with the annual spring banquet held April 18 at the Poinsett Hotel, Greenville. About seventy-five students, alumni and faculty members and wives and dates were present for the occasion. Also present was Professor Dan P. Thomson, who reminded the group that the chapter was chartered on May 18, 1927, in the same room in which the banquet was being held.

Mr. Alan B. Sibley of Judson Mills, Greenville, was the guest speaker. In his address, he painted a picture of the future bright with promise for the approaching textile graduates. He discussed briefly five of the outstanding qualities of a successful man: (1) Thankfulness, (2) Humility, (3) Buoyancy, (4) Faith in others, and (5) A sense of responsibility. Mr. Sibley reiterated the yet timely advice given him upon his college graduation: "You can put this in your pipe and smoke it; there are more good jobs than there are good men to fill them."

Retiring President McIlwain was Master of Ceremonies. During the course of the evening, he introduced the newly elected officers for 1947-48.

Following Mr. Sibley's address, movies of the 1945 Clemson-Ga. Tech. football game were shown.

CLARK NAMED SALES ENGINEER

Walter D. "Chip" Clark, who will graduate with a B. S. degree in Textile Engineering from Clemson College in June, was recently appointed Sales Engineer for the E. H. Jacobs Manufacturing Company of Charlotte, North Carolina, and Danielson, Connecticut, according to an announcement by W. I. Bullard, President.

Immediately upon his graduation, Mr. Clark will undergo a period of specialized training in the extension and development of Jacobs Plyweld in Southern textile mills. He will serve as representative in Georgia and surrounding areas when he succeeds A. P. Newton on August 1.

Mr. Clark, a native of Lexington, North Carolina, enrolled in Textile Engineering at Clemson College in 1941. On February 27, 1943, he entered the Army Air Corps, where he served as flight instructor at Stuttgart Army Air Field, Arkansas, in the Eastern Flyng Training Command. For a short time, he was located at the Memphis branch of the Air Transport Command as a ferry pilot. He was separated from the service at Maxwell Field, Alabama, September 21, 1945. He then returned to Clemson for the completion of his studies.

While at Clemson, he captained the football and golf teams and was a member of the basketball team, Block C and Minor C Clubs. He was Vice-President of Phi Psi Fraternity, and a member of Blue Key, Tiger Brotherhood, Sigma Epsilon and Gamma Kappa Alpha Fraternities. He was chosen for Who's Who Among Students in American Universities and Colleges for 1946-47.

Since 1869 the E. H. Jacobs Manufacturing Company has maintained a high standard of loom supplies, which now include the new Jacobs Plyweld products.

South Carolina Cotton Manufactures Association

By L. O. Hammett
President

Like textile associations of all kinds, the South Carolina Cotton Manufacturers' Association has been extremely busy in recent years. The encroachment of Government upon private business has made it more necessary than ever for the textile mills to have an effective clearing house for information and mutual protection.

Our state association now confines itself largely to matters within the state, with an excellent system of coordination on national and sectional matters having been worked out with the American Cotton Manufacturers' Association and the Cotton Textile Institute.

Unfortunately it is necessary in South Carolina that we carry on an extensive full time effort on state matters. For many years we have been hampered by almost constant threats of unfair and unreasonable legislation within the state. The Legislature as a whole has been fair in dealing with matters hostile to the best interests of the state, but there are always members who are striving to put South Carolina industry out of line with its competitors in neighboring states.

It is an important function of our state association to keep the Legislature informed as to true situations prevailing in the industry. We ask for nothing more than reasonable treatment and to be kept in line on legislation with our competitive states. As long as we are on an even basis the textile industry in this state will continue to compare favorably with that of other states.

I can say from personal knowledge, however, that South Carolina has lost important increases in the textile industry due entirely to the constant threats of improper legislation which have plagued us. During my brief tenure as President of the Cotton Manufacturers' Association of South Carolina I have found legislators generally to be high type men. A majority of them deplore, as we do, the pressure which comes at times for impossible legislation.

The Association has no specific program of activity, its main responsibilites being to keep its members and the public informed on current developments affecting the state and the industry itself. Individual mills, of course, set their own policies, but I am happy to say that in South Carolina we have a most pleasant relationship within the industry.

THE RELATION OF ART TO THE TEXTILE DESIGNER

(*Continued from Page* 10)

the patterns woven in these cloths were not impressive and the more expensive and artistic fabrics continued to be imported from Europe. The textile designer in America at this time was usually located in the textile plant and the patterns produced were generally such as to suit the manufacturer's ideas of design and texture.

The Boston Manufacturing Company, the first mill to produce power-woven cotton goods, experienced considerable difficulty in selling its product. Attempts to dispose of goods through an importing house were unsuccessful and this firm was forced to sell its fabrics through an auctioneer. This marked the rise of the commission houses in the United States, through which a large proportion of the cloth woven in this country today is distributed to the wholesale and retail trade. As the textile business expanded in America, the garment industry developed to the extent that the mills' idea of design and texture were not acceptable and the commission houses assumed the responsibility of developing new styles and designs. These selling agents bought European designs to enable them to obtain more business and compete with goods imported from France and England. With the exception of a few patterns produced by commercial studios in New York City, practically all designs of the better quality used in America, before the World War I, came from abroad. The American designer, usually a textile school graduate, continued to be located at the mill where his work consisted largely in working out technical details of designs furnished by the mill's selling agents.

World War I stopped practically all design creation in Europe and textile manufacturers in the United States soon learned that fabrics are purchased more for their decorative qualities than for their physical merits. Those converters who had talented designers and stylers in their organizations were able to obtain the greater portion of the trade in artistic fabrics. Commission houses and costume manufacturers in the United States felt this lack of designers extremely and made efforts to meet this need. They found that all the essentials were at hand. America possessed good art schools and textile schools and the museums were admirably fitted to furnish inspiration to American designers. But talented artists in this field were not to be found. For generations our designers had been discouraged and their creative ability dulled by the technical work in the mills. They had been poorly paid and the more talented artists had not entered this field. Commercial studios located in the larger cities produced textile designs but these patterns were mediocre and lacked originality. Consistent efforts were made to stimulate renewed interest of artists and designers in creating textile patterns. Lectures were held in museums by talented designers and artists on fabric structure and decorative art. Considerable work was done in art and textile schools along lines of research in design and its application to the textile industry.

Research brought out that the creative designer should possess the combined qualities of the "historian of art, draftsman, technician and style expert." The first of these is probably the most important as the greater portion of new patterns are created by adapting and modifying designs from historic fabrics. A good knowledge of drawing is essential in order that the designer may be able to easily and accurately transform his ideas into well-balanced patterns on paper. Technical knowledge is important especially in intricate woven designs to enable the designer to adapt his work to the loom, and to foresee the possibilities of color combination and thread intersection. Knowledge of market requirements is indspensable as it enables the designer to gauge the trend of style and his creations to the ever-changing fancy of the public.

Considerable designing talent has developed in the United States as a result of these efforts, thus increasing demands for American designers. Although the nations of Europe, since the end of World War I, resumed the creation of textile designs, a considerable portion of the designs used in America today continue to be originated by American designers and the tendency seems to be towards increased use of American creations. The advent of the second World War and the defeat of France again cut off the flow of original features from Europe to the United States, and at the present writing it seems that America is well on its way towards becoming the fashion center of the world.

TEXTILE EDUCATION IN SOUTH CAROLINA

(*Continued from Page* 13)

attitude on the part of leaders in the textile industry. The educational value of the athletic program carried on by many textile plants should not be overlooked. Participation in basketball and in baseball has taught that success is based on cooperation; that the subordination of individual rights for the benefit of the group is desirable. The athletic program truly is democracy in action and its influence has been felt by the spectators as well as by the players.

Trained men are important in the textile industry today. Science has taken the place of guess work and the processes are controlled to bring out a guaranteed product. Even though the number of college graduates in textiles has grown tremendously in recent years, excepting the years during the war, the demand for such men is not being met. One may expect this trend to increase because the surface of research in textiles has hardly been scratched. Not only are trained technicians in demand but trained workers of all types are necessary.

At one time it was thought that fine yarns could not be spun in the South and the weaving of fancy fabrics was out of the question because our textile labor was unskilled. The eagerness of the textile worker to increase his knowledge and skill by study, and the recognition by overseers and mill management of the value of an intelligent and educated worker has long ago disproved any such theories.

The day when anyone looking for a job could get one in a textile plant has gone and the industry is putting a premium on alert young workers capable of a high degree of efficiency and responsibility. Education in the textile industry has raised the standards of the industry, has helped rid the industry of its former notoriously low wage rate, has raised the morale and efficiency of all workers, and has made it an industry and an employment opportunity in which every South Carolinian may take pride.

Real education for textile workers as a whole did not begin until 1917. That year, Congress passed what is known as the Smith-Hughes Act, a vocational education act which provided among other things, money on a matching basis to the several states for conducting vocational all-day trade and trade and industrial evening extension classes. The first supervisor of trade and industrial education in South Carolina was Professor Charles S. Doggett, Director of the Clemson College Textile Department, who acted in that capacity for several years. The provisions of the Smith-Hughes Act were accepted by the South Carolina Legislature and matching funds were appropriated, which gave a total of Federal and State moneys of approximately $24,000.00 to be spent on trade and industrial classes. World War I, however, was on and little impetus was given to education in textile or any other industry in 1917-1918.

In 1923, the Parker School System, which comprises the textile plants and communities nearly surrounding the city of Greenville, opened a vocational department in which textiles was one of the major courses. This marked the beginning of a remarkable program of textile education in South Carolina. The textile course in the Parker School not only provided instruction to high school students in textiles, but also provided the leadership necessary to organize evening trade extension classes in the mills of Greenville and adjacent communities. In a few years, evening class work became, and still is, an institution in the Parker School District.

The superintendent of Parker District Schools, L. P. Hollis, and the vocational education director of the schools, Loui Greet, have not confined textile education to classroom work. These men have organized mill superintendents clubs, overseers clubs, section men clubs, and the Greenville County Textile Club. By these organizations, the Parker School has obtained the services of textile leaders in the area in establishing th curriculum of the textile courses offered, and in turn, the mills have obtained the assistance of men at the Parker Schools in organizing evening extension classes.

The influence of Parker was felt in all the textile areas of South Carolina and other Southern states, too. In 1925, textiles as a high school subject was added to the curriculum at Pelzer, Clover, Chester, Central, and Olympia schools. None of these schoools provided textile shops for students to work. The theory or technical instruction was given in the classroom and students were taken to the mill for practical instruction. As loosely organized as this work may have been, it served to direct worthy high school students toward the textile industry as a field of employment At one time, thirteen high schools in South Carolina were offering textiles as a high school subject. The scarcity of teachers because of their obtaining better jobs in industry, and the advent of World War II, forced some of these schools to close their textile programs but plans are being made to reopen a number of them.

In 1925, Clemson College graduated a number of men in Textile Industrial Education. This course trained graduates to teach textiles in high schools and was a major course at Clemson until World War II, when the college, of necessity, curtailed some of its activities. It is of interest to note that graduates in Textile Industrial Education, who taught textiles in high schools, almost without exception are today general managers or superintendents of large textile plants or hold responsible positions on textile school faculties at Clemson and North Carolina State Colleges.

Besides the high school textile work, three mills—The Abbeville Mill, Abbeville, S. C.; Gossett Mill, Williamston, S. C.; The Calhoun Mill, Calhoun Falls, S. C.—conducted part-time continuation classes in classrooms set aside in the mill for that purpose. Spare hands were provided to relieve regular workers for an hour a day in order that they might attend classes in arithmetic, English, health, economics and technical textiles. These classes as well as the high school textile classes did much more than impart knowledge. They developed a wholesome attitude toward mill work and the opportunities it offered those willing to study and apply themselves.

The peak of textile evening trade extension classes was probably reached in the period 1928 to 1938. During those years, approximately 300 evening or leisure time classes were conducted twice a year in South Carolina textile communities. Nearly 5,000 textile workers were enrolled in these classes annually, some mills having as many as sixteen. The growth in evening classes was brought about in part by the adoption of all the cotton manufacturing states in the South of a uniform course of with practically every mill in the State having one class and study called the Standard Cotton Textile Vocational Schools Courses of Study. These uniform courses of study divided the processes, including both the theory and fixing of the different machines, into units of instruction. This system enabled progressive study to be made of the major processes. A unit card was given upon the completion of each unit, and upon completion of required units, one could earn a diploma in carding, spinning, twisting, plain weaving, fancy weaving, jacquard weaving, or special fancy weaving. The system further provided a transfer of credit toward a diploma if the worker moved from one state to another.

See Page 21

Chicopee Manufacturing Corporation

WALHALLA

OCONEE COUNTY, SOUTH CAROLINA

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Cotton Textiles

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Chix

Chux

Macclinn

Lumite

Chix Disposies

THE NATIONAL COTTON COUNCIL

Continued from Page 9

The National Cotton Council, with other agricultural organizations, now is actively supporting the research appropriations bill before Congress. Enactment of this legislation will make possible the expansion not only of research to improve the quality of cotton products but also the expansion of research designed to lower cotton production costs.

Increased efficiency is the key to lower production costs for the cotton farmer. This greater efficiency can be attained through higher per acre yields, better farm management, and better farm machinery.

Great progress already has been made in increasing per acre cotton yields. During the past twenty years the amount of cotton harvested per acre of ground has increased by a third. Educational campaigns now being conducted by the Extension Services, the National Cotton Council, and other agencies are proving effective in bringing about still greater increases.

During the past decade the development of new labor-saving farm machinery has been phenomenal. The mechanical harvester, the flame cultivator, and four row cultivator and other machines have made it possible to reduce, in some sections of the Mississippi Delta, the number of man hours required to produce an acre of cotton from 160 to less than 30.

Through further experimentation it is expected that definite progress soon will be made to adapt the principles of mechanization more fully to the upland plains and hills.

Experiments in plant breeding and genetics are enabling the cotton farmer to provide the spinner with cotton better adapted to his needs. Much remains to be accomplished in this field, but within two decades the number of accepted types of planting seed has decreased in most sections of the Cotton Belt from several hundred to less than half a dozen.

The program adopted by the National Cotton Council for the months ahead calls for an intensification of efforts toward increased efficiency. The cotton industry knows that it cannot solve its cost problems by arbitrary acceptance of lower prices. Sound reduction of price must be accompanied by proportionate reduction of costs.

Most readily apparent are the results obtained in the Council's sales promotion and merchandising programs.

There are few who are unfamiliar with the sudden and spectacular rise of cotton to the peak of high fashion. Many of the same cottons which a few years ago were regarded by fashion leaders as suitable only for kitchen wear today are made up into glamorous afternoon and evening attire. Cottons which were sold in the bargain basements now are found in the swank upstairs salons.

Back of this climb to fame has been a well-planned and calculated advertising and merchandising campaign. The Maid of Cotton promotion, known from coast to coast, and which became international in its aspects this year, is one phase of the industry's fashion program.

But cotton's saleability has zoomed not in the apparel field alone. It has risen to new highs in the important bag market. The sack market, which now ranks as cotton's largest single outlet, is being nurtured through a sales and merchandising campaign conducted jointly by the Council and the Textile Bag Manufacturers Association.

Based on the thrift appeal of sewing with used food and feed containers, the campaign, during the short period of three years, has attracted more than three million direct inquiries from the housewives of the nation. Bag manufacturers now find themselves hard put to produce cotton bags in quantities demanded.

Cotton insulation, a product of research, began its career as a cotton outlet in 1940 when about 660 bales of lint went into the product. Today cotton is being manufactured into insulation at the rate of 100,000 bales a year.

No small share of the credit for this rapid rise is due to the joint promotion program initiated three years ago by the Cotton Council and the Cotton Insulation Association. The present consumption rate is expected to be stepped up even further as manufacturers are able to obtain necessary machinery for processing the cotton fiber into insulation.

There are still other phases of cotton's new promotion program which are bringing bonafide results. Several hundred of the nation's leading laundries last year cooperated in a campaign to carry to their customers the story of "Cotton Freshness." In a single transit advertising campaign, now in progress, the circulation figure already have reached more than 3 billion—the greatest circulation ever achieved by any cotton campaign.

Cotton has learned the lesson of greater accomplishments through unity of action. This year, more than half of all the farmers who produce cotton, and of the ginners who serve them, are supporting financially the cotton consumption program. Joined with the farmers and ginners are substantial majorities of all cotton compresses, cottonseed crushing plants, cotton buyers and merchants, and textile mills which spin cotton fiber into yarn.

Already, hard, direct, aggressive work: (1) to improve existing cotton products and develop new ones; (2) to lower costs of cotton production; (3) to increase the volume of cotton exports; (4) to put behind cotton products the power of modern selling, is being rapidly accelerated.

The research, production efficiency, cotton utilization, and export programs of federal and state governments; the research and mechanical development programs of private firms and agencies; the research, sales promotion, production efficiency and export programs of cotton's own industrywide organization, the National Cotton Council, have all contributed to this acceleration.

The added support of the cotton program which will come with heightened unity within the industry is certain to bring still greater victories in the battle for markets—the battle cotton must win.

THE COVER

Visitors to the Clemson College campus on Mother's Day, Sunday, May 11, didn't actually operate the looms or other machines which are used for the instruction of students majoring in textiles. However, the visitors, such as Miss Sarah Clement of Asheville, North Carolina, were given an opportunity to see how the students live and learn.

Mother's Day is an annual celebration when Clemson holds open house for the parents and friends of students. The barracks and buildings of the campus are opened for inspection, and the Corps of Cadets passes in review for the Honorary Cadet Colonel and for the visitors.

Miss Clement is a junior chemist in the testing laboratory of American Enka Corporation, Enka, North Carolina.

NATIONAL COTTON WEEK

(*Continued from Page* 12)

Historically, cotton mill production has very closely parelleled general American industrial activity. This is probably due to the fact that American industry normally consumes about 40 per cent of the production of cotton textiles in the manufacture of innumerable items such as luggage, shoes, plastic laminates, as well as a host of consumer non-durables made from the products of the rubber and coated fabric trades. As long as industry at large continues to operate at current levels, sales of cotton textiles to those outlets will continue at well above prewar rates—to bring an increasing supply of goods to stores for resale.

It is notable that cotton textiles are used in largest volume by America's wage earners and their families. Employment at current levels makes for increased sales of cotton apparel and home furnishings. There need be no concern about national purchasing power to support the demand for cotton textiles while about 60 million Americans are employed in well paying jobs and receiving for their services income payments at the rate of well over 150 billion dollars per annum. Moreover, population increases reveal 13 million more cotton consumers than back in 1937.

Taking into account major factors related to both demand and supply of cotton textiles, retailers can anticipate a profitable participation in Cotton Week's observance this year. In support of individual store promotions, mills, converters and cutters are expediting deliveries of cotton household and apparel tems to the wholesale and retail distributors. Likewise the cotton textiles industry collectively will undertake to effect customary nationwide recognition of Cotton Week through publicity channels to give forceful meaning to this year's theme—PICK COTTON.

TEXTILE EDUCATION IN SOUTH CAROLINA

(*Continued from Page* 18)

The depression years also caused an impetus in evening class
ork. Mills were operating only about half time and the work-
s had considerable leisure on their hands, a part of which they
ere glad to spend in classes. More important than that, how-
er, they saw that competition for jobs was keen and that the
ost efficient men were those retained in employment. The
erage textile worker seemed to realize that in the future, ef-
ciency would mean more and more, and most of them ap-
eciated an opportunity to increase their knowledge. Manage-
ent, too, began to realize that efficiency meant the difference
the mill making money and losing money. The old days
trial and error were gone forever. Mill management request-
educational programs and cooperated in many ways by
oviding places for the theory classes to meet and give over
ole sections of pickers, cards, fly frames, spinning frames
d looms for the fixing classes to work. The passage of the
ir Labor Standards Act in 1938 caused classes in the dif-
ent rooms of the mill to be discontinued, but machines were
up in workhouses, band stands, community houses, school
ises and even in basements of churches, in order that fixing
sses might be continued.

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TEXTILE PRODUCTION IN THE LAND OF ARABIAN NIGHTS

Continued from Page 8

Dyeing is not altogether confined to putting color in cloth. While traveling across the country Professor Blair saw one of the inhabitants who was colored blue. He later found that this man had been dyeing cloth with indigo at a nearby water hole, where the sun was producing a temperature of 120 degrees. After dyeing the cloth it is placed on the ground to dry in the sun.

After cloth is dyed a solid color, and is to have designs printed on it, it is cut up into short lengths. For the printing operation, the men sit on the ground with their feet in a hole in the ground and hold a flat wooden board in their laps. These wooden boards are as valuable tools to these men as wrenches are to our loom fixers. One end of the short length of dyed cloth is placed on the board and the worker takes a stick, which has a part of the design cut in the surface of it, out of the car of dye paste and he makes an imprint on the cloth about ter inches long. The stick is then returned to the dye paste anc the cloth is moved along the board, and the printing operatior is repeated. Each man prints only a part of the design, whicl may require as many as four men to complete.

The capital, Sana'a, is still a growing city. It has been ex panded several times, and each added part of the city has wall around it. At night the gates in the walls are locked. I spite of the fact that it is about 900 miles from the equator, i is at a high altitude, so that there is an ideal climate all yea round. In the guest house at Sana'a, the American flag wa flown next to the Yemen flag. Officials of the Yemen goveri ment stated that this was the first foreign flag ever to be place next to theirs.

Sana'a is the location of most of the textile industry, whic consists of one mill. Cotton yarn for processing is importe from Egypt, India and England. The mill has very hig rooms, the rafters of which are crooked timbers planed two sides because wood is at a premium, straight trees rare, ar steel costly. There are four mechanically powered dobby loor and a dozen Jacquard hand looms. One man operates ea of the dobby looms. One noticeable difference in these o looms and modern dobby looms is that the picker stick is fa ened at the top and hangs down. A string is attached to t bottom of the picker stick and is connected to the picker whi drives the shuttle. It takes one man and a boy to operate Jacquard loom. The small boy is stationed on top of the loc where the cards of the Jacquard loom are located, and he pu the cards for the plain weave into position when told to do and changes the cards when another design is wanted by t weaver.

Textile enployees receive approximately $3.75 a month, a work an eight hour day, five day week, about two hund days a year. There is one month of religious holidays wh no work is done. This month of religious worship is comm to the Mohammedan faith.

Yemen is planning to make herself self-sufficient with resp to textiles. Professor Blair drew up plans to meet the specifi tions given, which would call for the establishment of a cot gin, a yarn manufacturing plant, a bleachery, and a dye pla There would also be an increase in the number of looms c that now in use. Probably the greatest handicap to be overcc for the completion of these plans is the lack of knowledge modern production methods there.

It is interesting to note that the people of other count look to the United States for help in improving their te production.

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Job Placement

Mr. T. J. Ryan, representing the American Viscose Corp., discusses with D. A. Watson, Textile Chemistry senior from Greenville, the opportunities for chemists with that organization.

The job placement service offered by the Clemson School o
Textiles has for many years maintained the enviable record o
securing jobs for all textile graduates desiring assistance. Whil
this has not been a difficult undertaking during the past sever
years, the school may rightly be proud of the fact that its su
cessful placement of graduates in industry extends back throug
the years when employment opportunities were much less plent
ful than at the present time.

The School of Textiles has been greatly assisted in th
program by the many outstanding firms which continue
send personnel representatives to the school for the purpose
personally interviewing members of the graduating class.
this way, both firm and studnt become better acquainted; tl
this way, both firm and student become better acquainted; tl
opportunities offered by the firm. Thus the mills and supplie
who seek textile graduates are better able to secure men wi
the necessary qualifications, and graduates are able to obta
the type of job in which they are most interested.

The number of concerns represented in this way contin
to grow each year, as more and more of them realize the
vantages which this method affords to them and to the s
dents and the school. In addition to the desirable personal
lationships acquired, costly trips, other unnecessary expens
and needless losses of time from class are greatly reduced.

Among the organizations which have recently sent rep
sentatives to Clemson for the purpose of personal interviews a
American Viscose Corp., Burlington Mills Corp., Chicopee M
ufacturing Corp., Ciba Company, Deering, Milliken and C
E. I. du Pont de Nemours and Co., Fibreglass Corp., Mus
gee Manufacturing Co., Riverside and Dan River Cotton Mi
J. P. Stevens & Co., Tennessee Eastman Corp., U. S. Rub
Co., and Woodside Mills.

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The E. H. Jacobs Manufacturing Company of Charlotte, N. C. and Danielson, Connecticut, manufacturers and distributors of every variety of loom supplies, announces with pleasure the appointment of W. D. "Chip" Clark as Sales Engineer.

Mr. Clark graduates from Clemson A & M College in June with a degree in Textile Engineering and will be located in the South. He will be specially trained for the extension and development of Jacobs Plyweld in Textile mills and will be available for every JACOBS SERVICE in this progressive area.

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A survey of 401 mills operating DROP BOX Looms in U. S. and Canada shows:

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Tabulation of above survey sent upon request.

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THE
BOBBIN & BEAKER

STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

OL. 6 FALL, 1947 NO. 1

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THE BURDEN SHOULDN'T BE BORNE ALTOGETHER BY TEXTILE SCHOOLS

DAN RIVER'S TRAINING PROGRAM

PROGRESS
SEE FIRST PAGE

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The
BOBBIN & BEAKER

Official Student Publication
Clemson Textile School

Vol. VI **FALL, 1947** **No. 1**

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THE COVER--PROGRESS

Professor Wilson and his carding laboratory class inspect a new Saco Lowell roller top card which has just been received by the textile school. It is one of the many new pieces of new equipment being added to the school for student instruction. Other equipment received to date are Whitin super draft slubber, Saco Lowell twister with novelty attachments, a Cocker slasher and warper, Smith-Drum Geyser yarn dyeing machine, several new chainomatic analytical balances, and cord tester. Clemson College School of Textiles is on the move toward a bigger and better equipped school!

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In Memory

The late J. E. Sirrine, contributor to the progress of the textile industry and Clemson College.

Mr. J. E. Sirrine Passes

The passing of Mr. Joseph Emory Sirrine in Greenville, South Carolina, last August at the age of seventy-four, was greatly mourned throughout the textile industry. The rapid expansion of the industry in this section of the nation stands as a memorial to the genius of Mr. Sirrine. His firm started in the South and grew simultaneously with the textile industry in the South. The J. E. Sirrine Company is now known for is Engineering construction work for all industries in all parts of the United States and throughout the world.

Mr. Sirrine was born in Americus, Georgia. His father and mother were George William and Sarah Enodias (Rylander) Sirrine. Both his father and grandfather were Confederate soldiers. The family lived in Charlotte, North Carolina, for a short while and moved to Greenville, South Carolina, in 1876. At that time his father was in the wagon and carriage business. He worked for the betterment of schools, which his son Joseph was to continue in later years.

Mr. Sirrine was educated at the Greenville Military Institute and then Furman University, graduating with a Bachelor of Science degree in 1890. Honorary degrees of Mechanical Engineering by Clemson College in 1928 and an Doctor of Letters degree from Presbyterian College in 1941 were bestowed in recognition of his outstanding work.

Mr. Sirrine became a practicing civil engineer in 1890 and in 1895 became resident engineer for the construction of the F. W. Poe Manufacturing Company building being constructed by Lockwood Greene Engineers Inc.

He married Miss Jane Pickney Henry of Greenville in 1898. She passed away July 31st 1938. From 1899 to 1902 Mr. Sirrine was Southern representative for Lockwood Green in charge of Southern textile mill work.

The J. E. Sirrine Engineer and Architect firm was begun in 1902. In 1921 he formed the present J. E. Sirrine and Company with eight associates. The business is now being continued by eleven partners.

In addition to being consulting engineer, Mr. Sirrine was director of twenty-three textile firms, which were J. J. Stevens & Co. Inc., Dunean Mills, Brandon Corporation, Industrial Cotton Mills Company, Inc., Chiquola Manufacturing Company, Arcade Cotton Mills, Aragon Baldwin Mills, Watts Mills, Wallace Mills, Judson Mills, Piedmont Manufacturing Company, Piedmont Plush Mills, F. W. Poe Manufacturing Company, Ware Shoals Manufacturing Company, Graniteville Company, Woodside Cotton Mills, Easley Cotton Mills, Marion Manufacturing Company, Camperdown Company, Norris Cotton Mills, Anniston Manufacturing Company, Riverdale Mills, Inman Mills.

Mr. Sirrine was an active member of the American Society of Civil Engineers, American Society of Mechanical Engineers and the American Institute of Electrical Engineers, as well as being past president of the Greenville Rotary Club and one of the few honorary members of the International Rotary Club. He was also an honorary life member of Greenville Lodge No. 858 of the Elks.

In addition to industrial and civic organizations, Mr. Sirrine actively participated in religious affairs, having been a member of the vestry of Christ Episcopal Church, Greenville, South Carolina, past president of the Young Men's Christian Association, a member of Recovery Lodge No. 31 A. F. A. M., a Knight Templar, member of Hejaz Temple.

He was also a member of the Greenville Country Club, Poinsette Club, The Cotillion Club, Biltmore Forest Country Club, Merchants Club of New York, and the Newcomen Society of England.

On October 26th 1928, Mr. Sirrine became a life trustee of Clemson College, of which Dr. R. F. Poole, President said an "able, interested and devoted life trustee. Was helpful in the engineering construction of many buildings on (the) campus; was of much influence in securing the textile building. His council and advice was always meritorious and gladly given."

Mr. Sirrine came on the Board of Trustees as one of the outstanding leaders in the textile industry, which is the largest industry of this state. He was also of assistance to the school in many other undertakings. Upon the completion of the war, he worked dilligently to provide comfortable housing to provide for the increased enrollment at Clemson.

It was his dream to see the Clemson College School of Textiles become the equal of any in the world. Whenever possible, he would use his influence in procuring equipment for the textile school. He devoted much time and energy to raise needed funds.

Mr. J. C. Littlejohn, Business Manager of Clemson College and close friend of Mr. Sirrine's, pointed out that recognition of his valuable services is universal. He was the type of man that brought prestige to Clemson. Mr. Sirrine was very retiring. In many cases when he helped students to complete their education at Clemson, it was done without any knowledge of his assistance.

He possessed a good memory, hence did not have to rely on a multitude of memorandums as to what was going on or as to observations. He had a keen mind which made it possible to analyze a situation and outline a solution to a very difficult problem.

When bids were being received from contractors prior to 1938, for the building of the textile building, it was found that the fund available were not sufficient to include the heavy freight elevator. Mr. Sirrine instructed the contractor to install the elevator as proposed and send him the bill. When the new building was being designed he saw to it that suitable provisions were made for the new types of machinery that would come into use in the future. For example, that the beams would be strong enough to withstand the vibrations of looms going at a faster rate of speed than those in existance at that time.

He gave impetus to a movement for a great textile school at Clemson, the work of which is destined to provide an excellent school to train men for the advancement of the textile industry, not only of South Carolina but the world. This is now known as the J. E. Sirrine Textile Foundation.

(See Page 20)

The Bobbin and Beaker

Organized in November 1939 by Iotta Chapter of Phi Psi Fraternity, and published and distributed without charge three times during the school year by students of the Clemson College School of Textiles.

Address: THE BOBBIN AND BEAKER, P. O. Drawer 552, Clemson College, Clemson, South Carolina.

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Policy—

The views and opinions expressed in all guest articles are those of the writers themselves, and must not be construed to necessarily represent the views and opinions of the Editors of this magazine or of the Faculty of the Clemson College School of Textiles.

TEXTILE ASSOCIATION MEETING

Clemson College was host to the South Carolina Division of the Southern Textile Association November 22nd. Approximately four hundred textile executives attended the meeting held in the auditorium of Sirrine Hall. The meeting was presided over by Mr. J. L. Adams of Spartanburg, president of the South Carolina Division.

The program was opened with the invocation by Reverent E. W. Hardin, Pastor of the Clemson Methodist Church. Dr. R. F. Poole, and Dean Hugh M. Brown welcomed the members to Clemson.

Mr. George M. Wright, President of the J. E. Sirrine Textile Foundation gave an address about the activities of that organization. He spoke about the late Mr. Sirrine, then stated that the Foundation was set up for the betterment of textile education in South Carolina. It is planning a program to make it possible for the members of the textile school faculty to visit textile plants in the south so that they may obtain a first hand knowledge of working methods in the industry. The Foundation would make it possible for instructors to take charge of their classes while they are absent for short periods and provide traveling expenses. The Foundation is also working on plans to supplement retirement funds for eligible textile professors.

Dr. R. E. Rupp of the Lyman Division of Pacific Mills gave a talk on cloth defects in grey goods and explained how they affect the bleaching of fabrics.

Mr. J. T. Wigington, Director of the Division of Technical Service of the Cotton Textile Institute spoke on the importance of cotton fiber testing to uniformiy of quality in production and economies in manufacturing.

Because of the unusually large crowd for Homecoming, and in an effort to assist those in attendance at the Southern Textile Association meeting, several members of the Iota Chapter of Phi Psi Fraternity directed the visitors to the auditorium.

COMMENTS ON THE PUBLICATION

It is with genuine pleasure and enthusiasm that the students of Clemson College bring to you the BOBBIN AND BEAKER again. It is our hope that each succeeding issue will be an improvement over the previous publications and that all of them will continue to be of interest of our readers.

Our policy as has been stated in the past will continue to be our aim. Our primary objective has been to try to give our readers as complete and accurate information about the textile school as possible. The faculty, courses and equipment of our school are constantly changing. We have from time to time tried to keep those interested, abreast of these changes.

Secondly we have presented discussions and statements from various textile organizations of South Carolina and the nation. These articles will be presented by well informed people in the textile industry, for the interest of students and people working in the industry.

Thirdly we have presented information on technical subjects which we hope to continue for the interest of the readers.

Circulation—

The BOBBIN AND BEAKER is sent gratis to mill executives, managers, and superintendents in South Carolina, North Carolina, Georgia and other states, in addition to alumni and students. We have made a special effort to bring our files containing the address of alumni up to date. The circulation at present is about two thousand and plans are now being made to augment our mailing list. By maintaining our policy of free circulation we are able to send the BOBBIN AND BEAKER to whom we please, and treat all of our readers equally.

Financing—

With the exception of the Iota Chapter of Phi Psi, this publication is subsidized by no other organizations or persons, than those who purchase space for advertising. Without advertising to offset the costs of engraving, printing, and mailing, this magazine would not exist. We feel, however, that in return we are able to perform a service to the advertiser by placing his name and product before the buyers.

We have but two favors to ask of our readers, first that they favorably consider our advertisers when buying; secondly, we would appreciate letters, with your comments of criticism or approval so that we may have some indication of the results of our work.

To The Students—

A publication of this sort affords an excellent opportunity for the student to present their views in a professional way, giving them experience in writing, selling, and research. Original research is almost impossible for the student because of the lack of time and knowledge; however, it is possible to do research in gathering and consolidating the findings of others and presenting them in a form that may be of benefit to others as well as themselves. In gathering material the student must read and learn, doing this he will gain knowledge that will be helpful to him in later work.

When asked to make a contribution, the standard answer received from the student is, "I can't write" or "I did not do very well in English." When is a better time to learn, than while at college? Almost all prominent people are asked at one time or another to give comments on a subject, in written form. Here is your chance. It is also an opportunity to express yourself and present yourself to the industry.

Another important function of the magazine is the selling of advertising space. There are some students who are thinking of participating in the selling branch of the textile industry, here then is a chance for experience and contacts. Even if the student is not interested in selling as an occupation the experience will be helpful, bcause all of us at some time or another have to at least sell ourselves.

For participation in either of the above two phases of the magazine, the student is permitted to take the course English in Acion (Engl 300) taught by Professor John D. Lane. This class meets one hour a week, gives one credit, and requires no outside work.

The Burden Shouldn't Be Borne Altogether By The Textile Schools

By JOHN M. CAUGHMAN

This article was first presented in TEXTILE BULLETIN, December 15, 1946. The author is a former student of Clemson and graduated an honor student of North Carolina State College in 1930. He is past president of the Southern Textile Association and now Executive Secretary of that organization. At the present time he is general Superintendent of Spartan Mills, which posiiion he has held for the past seven years.

Our textile schools and their graduates do not need defending, so a reply to the article, "The Textile Graduate" (TEXTILE BULLETIN, Oct. 15, 1946), is slightly superfluous, but I do not feel that I can conscientiously pass it by without comment. Certainly our textile schools are not perfect, but they constantly are being improved. The same is true of all our seminaries, colleges and universities. There are many things that the young medical school graduate learns after leaving medical school, and I am certain that any doctor will tell the "graduate of 1947" that he (the doctor) has kept on learning long after his medical school days. I wonder if our student ministers are taught while in school how to handle a "gossiping sister" or a stubborn deacon? Did the "graduate of 1937" feel for four years in college that when the day came for him to receive his sheepskin that his education would be complete? Did it occur to him that when his teachers gave him reference reading assignments that he was preparing the student for continued study long after the end of his school days? Or did he feel that the teacher was simply making college days unpleasant?

He bemoans the fact that there were and are no text books on "How to get along with textile employees". Are textile workers so different from other workers that a text book should be written about them to explain the differences? I think it would be an insult to the whole textile industry if such a text book were written.

If this "1937 graduate" did not learn to get along with children while he was a child in a cotton mill community, if he did not learn to get along with students during college days, then no text book will do him any good. On the other hand, if he did learn to get along with children, students and professors without a special course, he will get along with the boss and textile workers or anyone else. Most of the valuable things that we learn in life do not come out of text books, but we learn only with age and experience and from the experiences of others. Society has not yet let future husbands and future wives gain prior experiences in the greatest of all responsibilities—the bringing into the world and the rearing of children.

The fact that a few people have said that a textile school is the last place they will send their boy is no reason to condemn the textile schools or to feel that men have lost faith in the industry. Have you ever heard a doctor say, "I hope my boy stays out of medicine"? Most of us have our down-in-the-mouth spells about our jobs, but deep down most men who are successful in their chosen line of endeavor hope their sons will choose the same field of endeavor as theirs. After all, do not parents make a mistake in "sending" their sons and daughters to college? Shouldn't the boy or girl be allowed to choose his or her life work, and be encouraged to prepare himself or herself in the best way to begin that chosen work?

In my opinion, too many people go to college with the wrong idea. If boys or girls go to college with the idea that they are going to spend four years getting a diploma, which in turn enables them to command a "big job" or high salary simply because they have spent four years behind the four walls of a college, then it would be better that they not waste the time and money on four years in school.

I am not being idealistic in the following statement, but very practical. Boys and girls should not seek a college degree with the false idea that it will make it easier to earn a living, but with the idea that it will prepare them to live better with their fellow men. They should seek an educaion with the idea of preparing themselves to live such a life that the community and the world in which they live is better because of what they have contributed to others. Has the "1937 graduate" served a group of boys as a scoutmaster, a Sunday School teacher, a school trustee, chairman of the Red Cross or Community Chest drive, or any other activity; does he dodge jury duty, fail to vote and too busy to work in his church?

The training that a boy or girls receives in school is simply a nice set of tools to start life's work, the equipment with which to begin to work. Lock that training in some dark box of one's mental storage chamber and it soon becomes foul with rust and beared with uselessness. Use that training and it becomes shining with ideas. The young college student must learn to always keep his thinking clean shaven—even to the time of retirement. The most expensive set of camel hair brushes and the most expensive

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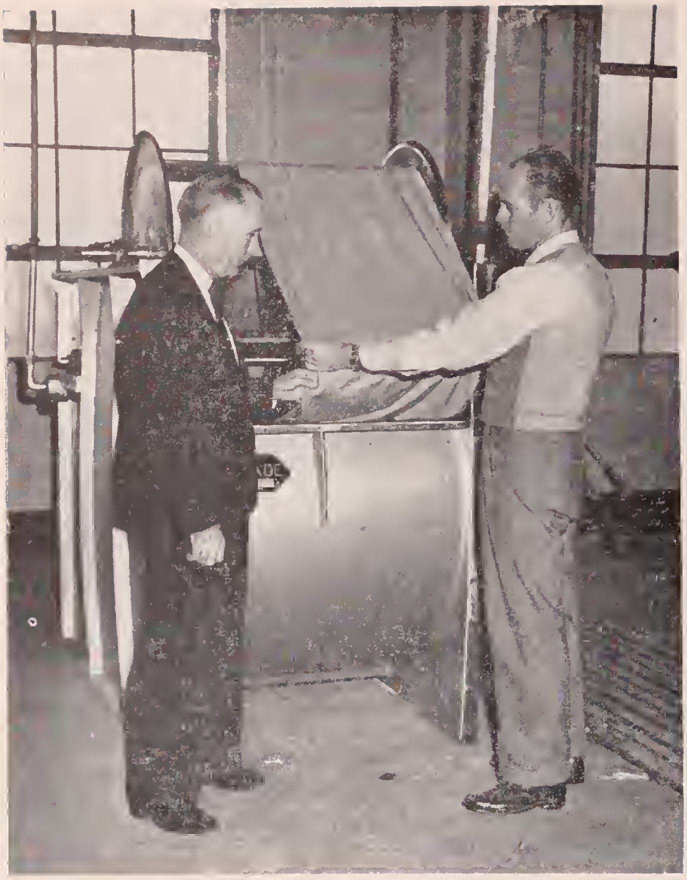
Why Textile Chemistry?

By GEO. M. MOISSON, JR. '49



Professor Joseph Lindsey and the author inspecting yard goods finished on a dye jigger.

Specialization is being emphasized in every field of education at present. The employer of college graduates is placing less and less stress on the Bachelor's Degree, and more emphasis on the immediate value of the man's training in his chosen field.

In order to make this article interesting ot both the student and his future employer, the writer is faced with a sort of delemma: whether to dramatize the field of Textile Chemistry and Dyeing, or to present only the facts about Clemson's "T. C." curriculum. A compromise is perhaps the best solution.

In reference to the employer's needs, as before mentioned, a broad knowledge of chemistry is valuable to the general chemist—an undisputed fact; but, for a man to apply his general knowledge to a specialized field, a period of concentrated study is essential. If, however, the new man is more or less conversant with the applications of chemistry and dyeing in the textile field, he can be of more immediate value to the industry. This knowledge is usually of intrinsic value to the employer, and one who possesses it will command a larger starting salary.

The author investigated several large textile plants before starting his course of study at Clemson. It was found that of the three textile courses offered, that of textile chemistry was the least crowded; and, in direct proportion, the needs of the industry reflected this condition. Textile chemists and colorists who know their jobs will not have to search long for employment in the near future.

To allay the fears of those prospective students who have not chosen to specialize; and who desire to build a broader foundation to support future graduate work, it is pointed out that the more advanced courses in general chemistry may be taken as elective work.

Of course, the textile chemistry courses place their emphasis on the processes most applicable to the industrial needs, but the basic principles are identical with those taught in general chemistry courses, and the practical laboratory work is essentially the same. The object of all these comparisons is to show that the graduate in textile chemistry need not fear that his adaptability will be impaired by specializaion.

In line with his study of chemistry the textile student is made familiar with the processes involved in the various phases of the manufacture of fabrics. Emphasis is placed on cotton processes; but wool, silk, linen, and the synthetics are reviewed sufficiently to acquaint the student with the broad scope of the industry.

The intriguing story of cotton, from the field to the drygoods counter, is told by professors who have had years of experience in practice and teaching. The structure of all fibres and the chemistry of their processing are taught by men who are outstanding in their respective fields. No Clemson man will admit any other school's claim to superiority in faculty "know-how!" It is up to the student to avail himself of his opportunities to learn from these men.

Professor Joseph Lindsay, Head of the Textile Chemistry and Dyeing department at Clemson, has compiled some interesting data on the basis of information obtained from other textile schools in this country. The replies to his queries, averaged for seven schools, are as follows: Each graduate seven textile chemists in 1947; each had jobs offered for thirty. Average salaries offered were from $200 to $300 pr month; some were much greater. The Deans of several of these schools expressed th opinion that the field of textile chemistry will **never** be crowded.

If this article serves to attract only one new man to the field, it will have served its purpose. It is hoped, however, that many more men will see the advantage of specialization, and by joining our ranks they will provide the industry with a much needed commodity in the form of **trained** personnel.

Dan River's Training Program

By TRAINING DEPARTMENT STAFF

Dan River Mills, Inc., Danville, Virginia

It has been said that Dan River is a graduate school for Clemson men and the statement is close to correct. We have Clemson men from the Class of '27 through the Class of '47.

It is to one's advantage, when seeking a job or, preferably, a "position", to obtain one in which the individual may develop his aptitudes and attitudes to the fullest. It occurs to us at Dan River that you might be interested in knowing how one progressive textile mill handles its selection and training of new supervisory personnel. Let us assume that your senior year is near completion and representatives of various organizations are around looking over the prospective graduates and you are in turn looking over the companies and their afforded opportunities.

As a result of hearing the success stories about Clemson men at Dan River and our representative's visit, you drop our divisional manager a note expressing interest in Dan River and you decide upon a mutually agreeable date for your visit. Upon arrival Mr. Henderson, Manager of Schoolfield Division, would cordially greet you and send you upon an extensive inspection tour through our Yarn, Weaving, Finishing, and Research Departments. This consumes a full day. The next day you would be conducted to our Testing Service. Here we present our overall picture of trainee responsibilities and opportunities, as well as, administer aptitude tests. This, along with the conferences with top management, is very important; as, to a certain extent, a man's future rests upon the decision that the applicant and management make as a result of the individual's impression of the organization and vice versa.

Clemson Applicant Dale G. Vander Voort, M.E. '46, being interviewed by Mr. C. J. Schollenberger, Director of Training (center), and W. B. Williams of the Testing Service in June '46. Mr. Vander Voort is now Superintendent of Dan River's Electrical, Carpenter, Machine, and Pipe Shops.

Schoolfield Division of the Dan River Mills, Inc. Over twenty-five Clemson men are working in this division.

Selection on the supervisory level begins with a cordial reception of the applicant and a coke and cigarettes are in order. As you remember from your courses in personnel, the purpose of this is to establish rapport.

A discussion of the selection techniques will be of benefit in that you as a potential applicant may get a picture of what sort of thought patterns one progressive mill is interested in. No secrets will be revealed since we have none. Any forthright organization is desirous of letting you know what is expected of you and what opportunities may be exchanged for your effort out put. It so happens that everyone is not constituted the same and that some individuals may fit very well into one organization or type of work and not into another. It is therefore possible to predict by tests and an objective patterned interview how an individual will fit into a given organization. Before such techniques may be utilized in employment selection, it is first necessary to devise a group of questions or attitude inquiries and apply these to your present working force. If the test is valid, the Testing Service will find that a majority of the more successful people respond in manner "A", whereas a majority of the less successful will respond in manner "B". A concrete example of what might be an objective personality item is that, in general, we've found that those with a Southern or even nondescript accent are more successful than those with a Yankee or, more specifically, a Brooklyn brogue. Such items are subject to statistical weighing.

We are presently working out statistical weights for positive reactions to such conditions as evening school attendance, acceptance of shift work, and overall control consciousness such as periodic tests. The nature of these tests may be experimental, evening school course content, or general plant knowledge.

It so happens that all our successful supervision goes to night school two to four nights a week. Either a man is or is not willing to devote several evenings to learning

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Quartermaster Training Available To Textile Students

By E. B. MAY

A Quartermaster ROTC Unit was activated at Clemson College with the beginning of the 1946-1947 term. Major Walter F. Hall, QMC, is in charge of instructing this Branch of the ROTC. It is composed of cadets from the schools of textiles, agriculture and chemistry. The students selected for the Quartermaster course are majoring in subjects at college which closely parallel the various duties performed by the Quartermaster Corps.

At the present time the Quartermaster Corps has civilian personnel in charge of some phases of their research and testing programs. It is hoped that by getting men schooled in a particular field, as in textiles, and having commissions in the Quartermaster Reserves, that the technical experts can be helped in their research by these officers who are receiving this additional training thereby. In this manner a more workable organization will result. It is hoped that Clemson men with Quartermaster Reserve commissions, can be assigned active duty tours in testing and research laboratories.

If the graduate was assigned to such work he would receive valuable experience in the field of research that would prove beneficial to him if he later went to work in the industry. Today more research than ever before is being done in the textile industry. Individual textile firms in many cases have their own laboratories. Organizations for research have been set up by groups of mills. The Department of Agriculture has laboratories like the one here at Clemson, throughout the country which are conducting experiments all the time, for the benefit of farmers, manufacturers and consumers.

The graduate while doing research may find that he would like to stay in the Army permanently. This would be the best method of determining whether a person was suited for making the Army a career. A competitive tour of two years is required. The procedure for the Quartermaster Corps is stated in the War Department Circular No. 210, 1947.

The Army has prepared a colorful bulletin "YOU AND THE QUARTERMASTER CORPS" which dramatically outlines the work of the Corps. The parts of this booklet dealing with textiles point out that during the last 150 years of our history in which this country participated in seven wars, the Quartermaster Corps provided the best of clothing and equipment. The American fighting man had the reputation of being the world's best dressed soldier. "Because the Corps has been in the clothing business for such a long time its textiles know how—will be of immeasurable value to the reserve officer interested in civilian clothing supply."

QM Cadets at Summer Training Camp

A few examples of the kind of work that is done would be along the lines of finding the kind of fabric for the best protection against the harshness of an Arctic winter, or cloth that will not mildew in humid tropics. A large project done by the Army has been with hot and cold climate clothing. This work is being continued at the present time. Still another problem has been to obtain a water repellant fabric that will not crack in cold climates and melt in hot climates.

Testing is done by the Army in rooms at which the mercury in the ordinary thermometer would freeze, sometimes as much as 70 degrees below zero Fahrenheit. For the other extreme, temperatures over 150 degrees Fahrenheit are produced with salty humidity added to stimulate the climatic conditions on small tropical islands. Any other climatic variations may also be reproduced.

Much of the textile research work done by the Army takes place at the Quartermaster Depot in Philadelphia, Pa., and testing by the Quartermaster Board at Camp Lee, Va. Work done by the Quartermaster Corps during the War in developing the best fabrics for each distinct use and climate is being continued so that the American soldier may continue to be the best outfitted soldier in the world.

Research and development activities generally follow three steps as outlined in the Army's bulletin "YOU AND THE QUARTERMASTER CORPS". "First, research laboratories develop the new article. Their work is usually based on reports from the field that a new or an improved article is required or from studies of similar articles issued to troops of foreign armies that appear desirable for adoption by the U. S. Army. Research laboratories have turned out a variety of interesting products, such as the waterproof match, a new synthetic detergent to take the place of soap in field laundries, and various types of packaged rations.

"Next, The Quartermaster Board conducts field trials and other extensive tests to determine the durability, efficiency, and safety of the new or improved articles. If the new item is an experimental combat ration, for example, the new food is served to selected groups of men for an extensive period in a carefully controlled experiment. If the item is a new shoe or boot, it is worn for several hours every day for many weeks on a'shoe course' which simulates

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Our Progressive Textile Industry

By DOCTOR HUGH M. BROWN, DEAN TEXTILE SCHOOL

The following is a discourse by Doctor Hugh M. Brown, Dean of Clemson College School of Textiles which explains some of the changes that have come over the textile industry. This speech was transcribed and presented by several radio stations on the program, "Textile Topics", which is sponsored by J. W. Valentine Company, Inc., New York textile selling agents.

"It has often been said that the textile industry is backward or static. Of course, textile manufacuring is one of man's oldest industries, which for ages was a handicraft or art. It cannot be compared with newer industries that originated and mushroomed to enormous size almost within our own time.

"But the textile industry is not to be called backward, considering the changes since Whitney's cotton gin and the advent of mechanical power. While new industries like the automobile or radio develop suddenly into colossal enterprises, the textile industry has always been large, and seems less spectacular.

"This industry changes continually. Like the pioneers, it has moved—from North to South here in America, and also from England to India. While these moves were made toward more economical sources of labor, production costs were being attacked on another front—the more efficient use of power.

"Much tedious hand work was eliminated by inventions of automatic machinery for ginning, spooling, winding—for tieing-in, drawing-in, and weaving. These, and new automatic high speed knitting machines, are marvels of the industry. A cotton mill was recently defined as 'a place where they make a lot of noise and have no people'. Today, precision in machinery is eliminating the noise, too. These labor-saving devices have more than double the wages for each laborer—a trend seen in all the more prosperous industries. Farmers, too, have mechanized, with power-driven multiple-row planters, mechanical hoes, flame cultivators, and mechanical harvesters. One man can now grow and harvest one hundred acres of cotton in a season.

"Textiles for the consumer have undergone the same change. In our mothers' day, every housewife could tell, with her eyes and hands, the quality and content of a piece of cloth. Now it requires an expert technician with laboratory equipment to analyze cloth. The fabric designer has become a fabric engineer. Taking many new fibers in different forms, he blends them together or with natural fibers. He can treat them chemically to produce waterproof, shrinkproof, of mildewproof fabrics, or give them crush resistance, flame resistance, or improved appearance. Already millions of yards of non-woven fabrics are resulting from the combination of plastics and textiles, and this trend is just beginning.

"Into this picture the textile schools must place a new type of graduate—one having more background in physics, chemistry, engineering, and research. The industry needs more college trained men to cope with the chemistry, electronics, and complex machinery used today. Post college training is now being requested for certain personnel, and more training in human relations is also being demanded. Fortunately, the progressive textile schools of our nation, with the help of the industry, are prepared to meet this new challenge."

ADDRESS CARDS

The staff of the BOBBIN AND BEAKER with the help of Dean Hugh M. Brown's office recently sent double post cards to the Alumni of the textile school. These cards were purchased through the school. They were sent to the address of each graduate now on file in the school office. Many graduates have not kept the office up to date when they have made changes. Some of the graduates recived these cards directly, but many had to be forwarded and some were returned as unable to locate. The reason for these cards is to correct the addresses on file.

From time to time requests are made to the textile school for men with certain qualifications to fill specific positions. The school knows of men that would qualify but are unable to reach them so that they may know of such openings.

The other reason for this project was to obtain the correst addresses for the circulation of the BOBBIN AND BEAKER. Because of large mailing list, the magazine is mailed fourth class mail, which means that it will not be forwarded.

The task of addressing the 1200 cards was under the direction of the circulation manager R. E. Taylor. To date we have had 500 filled out and returned. We were unable to reach 30. If you are one of those graduates we were unable to reach, or your card was mislayed and not returned, we would appreciate your filling out the form at the end of this page and sending it to BOBBIN AND BEAKER, Circulation; P. O. Drawer 552; Clemson, S. C.

A few interesting facts have been noted from the kind of work being done by the graduates. Although the great majority were employed in the textile industry, it was found that some were employed in hospitals, banks, post offices, farms and newspapers; others were in the insurance, florial, laundry and automobile business; several were still in the service and others were soil conservationists, plantation superintendents, students and one a physician.

A survey shows that about fifty percent of the alumni that graduated before 1920 are not in the textile business. Of those that graduated after that date, approximately ten percent are not presently associated with the textile industry. Perhaps the reason for such a low percentage of graduates before 1920 continuing in the textile field can be attributed to the fact that during that time the state authorized a certain number of scholarships for men of each county to study textiles and agriculture.

We want to thank the alumni who filled out the address cards and mailed them in. Without your help this project would not have been possible.

Full Name ....
Street Address ....
Town and State ....
Position ....
Organization ....
Location ....
Year of Graduation ....
Years in the service ....

Deering Milliken to Build New Plant

On December 6th, Mr. Roger Milliken, President of the Deering, Milliken Company announced that his firm had decided to construct a four million dollar mill in Anderson County, South Carolina. This decision by the Deering Milliken interests is increased evidence that the textile industry finds this section of the country, and South Carolina in particular, offers many advantages to textile mills. The plant will employ between four and five hundred individuals, and would be used to weave rayon fabrics. This large plant will enlarge the textile production of this section which is already one of the major textile centers of the country.

Mr. Alan B. Sibley, one of the outstanding men in the textile industry, will be in charge of manufacturing operations. Mr. Sibley is now treasurer of Laurens Mills and Judson Mills.

Mr. Milliken stated that this new mill will be "the finest industrial plant in the country. This modern rayon weaving mill, will not only be the last word in mill construction, but will also contain new machinery especially designed for the production of filament rayon fabric."

A three hunded and twenty-five acre tract has been secured. Construction will be done by the Daniel Construction Company of Greenville, S. C. According to Mr. Charles E. Daniel, the work on the construction will start not later than the first of the year. The construcion materials have been on order for some time. It is planned to have the plant finished and operating in July, 1948.

The mill will be entirely for the weaving of high quality filament rayon cloths. The rayon will be twisted and woven on machinery which is of a new design, especially for production of this fiber into cloth. This machinery has been on order for quite a long time so that it will be ready for installation and production upon completion of the building.

Before deciding on the site near Pendleton, the Deering, Milliken Company had considered sites in Saluda and Belton, South Carolina and Hartwell, Georgia. The Board of Directors of the Anderson Chamber of Commerce together with the civic-minded citizens of Anderson County provided a free site as an indication of the people's cooperation with the Deering, Milliken interests in situating the plant in this locality. The excellent labor relations existing in he Anderson Area was another influencing factor in choosing this site.

Work in raising the necessary funds was done by the directors of the Chamber of Commerce which includes H. G. Anderson, W. W. Anderson, Donald E. Brown, Frank Brownlee, D. W. Jones, Jack Terry, Mastron Bell, F. E. Collins, Jack Childress, W. E. Gallant, W. L. Watkins, President J. F. McCallum, James Beaty, Guy Sullivan, D. O. Dunlap, W. E. Walker, Wilton E. Hall, H. B. Harper, C. B. Nichols, J. W. Hare. Mr. Daniel of Greenville, T. Frank Watkins of Anderson, E. N. Sitton of Anderson and Pendleton and Mayor Julius Aull of Pendleton also worked with the Chamber of Commerce.

This mill will be the largest industrial plant to locate in Anderson County since the completion of the war. The location between Boscobel Lake and Pendleton will only be a few miles from Clemson College. The Pendleton plant will be larger than the Deering, Milliken plant at McCormick, South Carolina, by one third. The design and construction will be similar to the Deering Milliken plants at Clemson, Johnston, and McCormick, South Carolina. At Johnston and McCormick are two of the latest constructed mills of the Deering Milliken interests.

The Clemson plant is also of recent construction, for finished rayon products. Incorporated in the designing of these buildings has been the latest ideas in mill construction, for the best possible working conditions. They are windowless structures, with modern fluorescent lighting. The mills are completely air-conditioned and refrigerated so that constant temperatures can be maintained the year-round.

The mills have been constructed with concrete floors, walls and roofs. The Pendleton plant will have one room on one floor three hundred feet wide and five hundred and forty feet long. A section for offices will be on the front part of the building, this section will contain windows. The mill grounds and surrounding area will be landscaped to make the plant as beautiful as it will be functional.

In addition to the mill, there will be constructed eighteen or twenty brick houses. These homes will be in the vicinity of the mill and be occupied by key personnel.

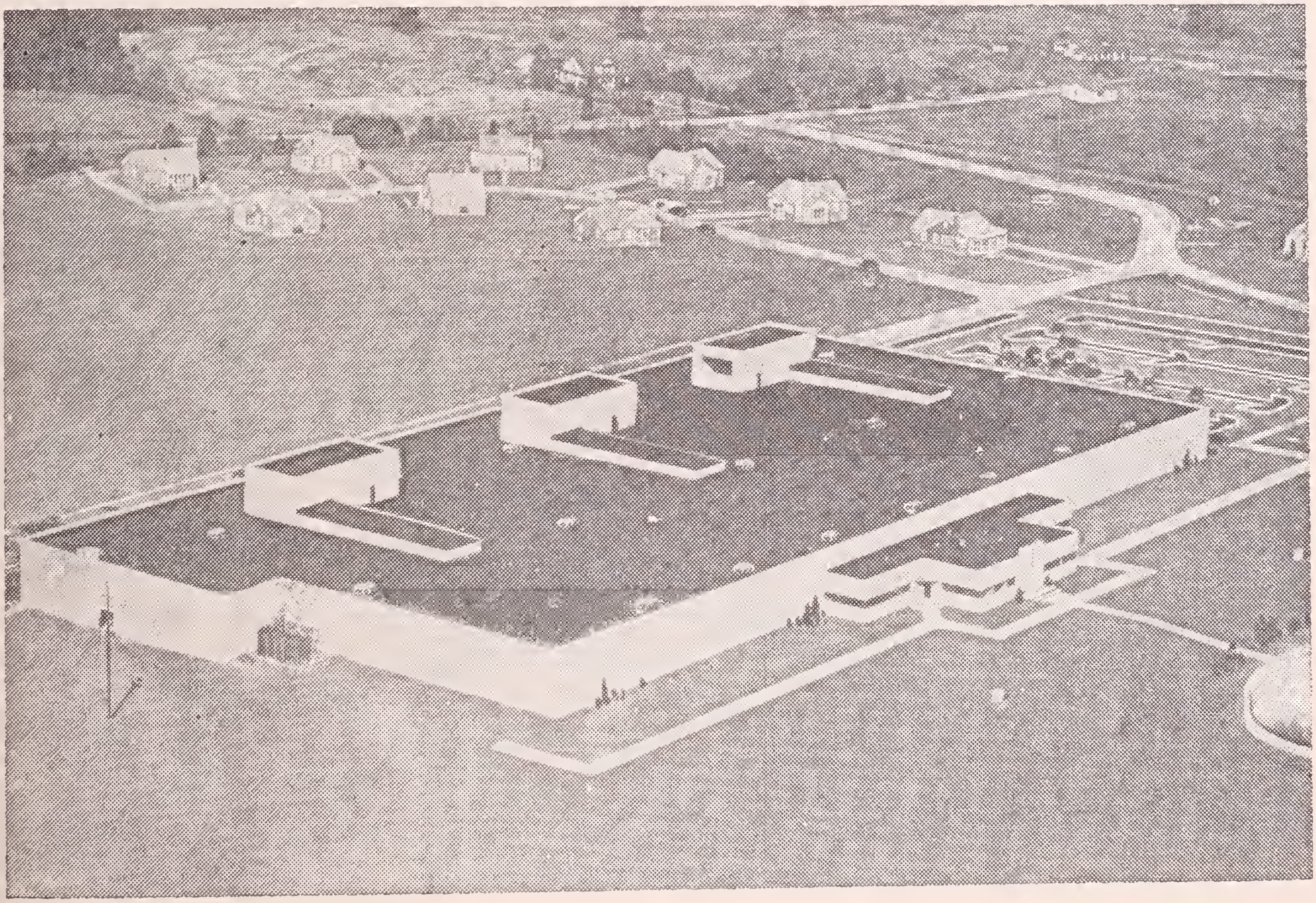
Mr. Roger Milliken was very much impressed by the cordial relationship which exists in Anderson County between employes and employers, and the fine labor record that has been maintained. This new industrial plant will mean about a $1,250,000 increase in the annual payroll of this section.

Governor J. Strom Thurmond of South Carolina said in a message to Mr. Milliken, "Congratulations on the decision to locate your sixteenth plant in South Carolina. We are delighted that you have so magnificently recognized the abundant advantages our state has to offer industry. We anticipate a continuation of the industrial development in South Carolina because of our favorable climate, natural facilities, and a plentiful supply of native-born friendly labor. We sincerely hope that your sixteenth plant is only the beginning. Please feel free to call on us for any assistance we can render."

Doctor Frank R. Poole, president of Clemson College stated, "I'm happy to know that Deering, Milliken is building another fine plant in this section of South Carolina. Clemson College is happy and will extend to the officials of this company and the people it employs every possible cooperation. We shall offer to them the full facilities of our textile engineering and agricultural schools, with the hope that we can be of service to them, it will be a fine addition to South Carolina industry."

Mayor Julius Aull of Pendleton is reported to have said that Pendleton is mighty happy over the location of this very modern plant near us. We have worked hard to 'sell' the Deering, Milliken interests on the advantages of this section. We know they will never have cause to regret their decision in selecting this site for the location of their plant.

(Note: Some of the material presented in this article was obtained from Vol 32-No. 68 of the Anderson Independent.)



Pictured here is the Deering, Milliken plant at McCormick which is three fourths as large as the mill to be constructed by that company at Pendleton, South Carolina, a few miles from Clemson College. The Pendleton mill is to be of the same design, costing over $4,000,000, with 165,000 square feet, consisting of one room on one floor, the mill having no windows. This ultra-modern mill will produce rayon fabrics. About 400 people will be employed, receiving an annual payroll of over $1,000,000. Daniel Construction Company of Greenville, South Carolina, will build the plant. Mr. Alan B. Sibley will be in charge of manufacturing operations.

New Professors

By A. M. HAND '48; B. B. WILLIAMS

The faculty of the Textile School of Clemson College has been augmented by the Professors whom we would like to introduce at this time. These men have come to Clemson during the summer and fall semesters of this year. Some are graduates of Clemson College, the others are from neighboring colleges. To all we extend a hearty welcome and hope that you will be as happy here as the students are to have you with us.

J. C. HUBBARD, JR.

Professor Hubbard was a member of the class of 1942, receiving his B. S. degree in Weaving and Designing. Immediately after graduation, he entered the service and saw action in the Pacific Theater of Operations.

Upon discharge from the army in the spring of 1946, he joined the technical staff of the Institute of Textile Technology at Charlottesville, Va.

Professor Hubbard joined the faculty of the School of Textiles at Clemson in the fall of 1947.

ROY A. JONES

Professor Roy A. Jones came back to Clemson this fall to teach Cotton Opening, Cleaning and Picking and Cotton Marketing. The last time that he was officially here, was when he graduated in 1932. From here he continued his education in Textiles at North Carolina State summer school. To further his education he took a business management course at Furman University for a summer. He then taught school in West Columbia, S. C.

After that he was on the executive force of the Columbia Mills in the production department. He also did some work as the athletic director of the baseball team, being manager of the Columbia Mills team.

In 1936 he went to McColl, S. C., to work for the Malboro Cotton Mills. He had an operation while there which resulted in his being unable to work until 1940. At that time he became associated with the War Department Textile Division, Inspecting Branch. His territory was from Boston to Atlanta. His job was inspecting work done by mills and finishing plants for the government.

Mr. Jones is from Newberry, S. C., and his wife, the former Constance M. Booth, is from Buffalo, N. Y. They have a three year old son.

WALTER J. CRENSHAW

Professor Walter J. Crenshaw graduated from Clemson College in 1938, receiving his B. S. degree in Weaving and Designing. After graduating he worked in the Production Department of Burlington Mills Corporation at Burlington, N. C. doing Jacquard and dobby designing as well as scheduling production until December 1941.

He served four years in the Army and spent thirty-one months in the Pacific Area as Captain of Infantry being in Hawaii, New Guinea, Philippines and Japan.

Upon returning from the Army, he was employed by Norwood Woolen Mills of Briston, Va. to supervise installation of a cotton spinning unit. Prior to coming to Clemson this fall Mr. Crenshaw was employed as assistant to manager of Mil-Art Co. Inc. of Spindale, N. C. and was in charge of fabric deevlopment.

The subjects he teaches now are Advanced Dobby Design and Jacquard Mechanics.

Dr. A. N. J. Hehn

Dr. A. N. J. Hehn was born and reared in Detlft, Holland. He received his Candidats Degree (equivalent to our B. S.) in General Botany from Utrecht University June 27, 1927, his Doctoraal Degree (equivalent his PhD in 1931. From September 1929 to January 1936 he worked as Assistant and Chief Assistant with professor Dr. F. A. F. C. Went at Utrecht University.

Dr. Hehn also worked at the following places: Laboratory of Michobiology, Delft; Laboratory for Technical Botony, Delft; The experimental garden of Professor Hugo de Vries at Lunteren; and the X-Ray laboratory of the University of Amsterdam.

Dr. Hehn was sent abroad to do research work where he spent considerable time in the laboratory of the College de France; Laboratoire de Cytologie Vegetale; Textile Physics Laboratory in Leeds.

In 1936, Dr. Hehn was sent to the Netherland East Indies on a mission to carry on investment and research work in the Trueh Laboratory at Buitenzorg on Chromosomes of tropical cultivated plants in relation to breeding and on a phytopathological subject of fusaruim rot in sugar cane. It was there that he started research work on the molecular structure of fibers from tropical plants and as a result of this work he was asked to accept a position as a Government Technologist in the Department of Economic Affairs which he accepted in 1937.

Dr. Hehn established his own laboratory at Djoejakarta and did research work on development and structure and the production of plant fibers especially cellulose, pectin, retting processes, cellulose bacteria. Dr. Hehn also established three large factories of Coir yarn.

For the past twelve years Dr. Hehn has specialized in fibers and textiles which is his field at present. Dr. Hehn has written books that have been published in French, German and English. He was appointed to the faculty of the Clemson College Textile School during the Spring of 1947.

WHITTEN

Professor Whitten, member of the class of 1947, received his B. S. degree in textile engineering from Clemson. He immediately accepted an appointment to the faculty of the textile school as instructor in weaving and designing.

While at Clemson, Professor Whitten was a member of the Iota Chapter of Phi Psi Fraternity.

His course of studies was interrupted by service in the Army. While in the Army he saw active duty in the European Theater of Operation.

ROBERT G. CARSON, JR.

Professor Carson, member of the class of 1939 receiving his B. S. degree from Clemson College in Weaving and Designing. While at Clemson he was a member of the Iota Chapter of Phi Psi, the honor textile fraternity.

Following his graduation he worked for the Callaway Mills for two and a half years in the Army, following which he worked for a year and a half in a garment plant, first in the standards department and later superintendent.

He was appointed assistant professor of textiles in the fall of 1947. He now teaches introduction to textiles but will have classes in time study in the future.

BERRY

Professor Berry graduated from the Philadelphia Textile School in 1941 after completing a course in Weaving and Designing. Before that, however, he worked for the Collins and Itman Company doing work in designing and costing. His formal education also included two years of Mechanical Engineering at the University of Pennsylvania.

Before coming to Clemson Mr. Berry did some designing and engineering work for the LaFrance Industries at Pendleton, S. C. He was appointed to the faculty in September and is now conducting classes in Sophomore designing, cam loom fixing, and introduction to textiles.

JAMES MacDONALD, JR.

Professor James MacDonald, Jr. is the new instructor of knitting in the textile school was appointed to the faculty in June 1947. He studied textile engineering at Georgia Tech for three years. At North Carolina State College he received a B. S. degree in Textile Management in June 1947 after completion of three years of study.

While at North Carolina State College Mr. MacDonald was a member of Sigma Tau Sigma which is the local honary textile fraternity. Members are chosen on scholarship.

Since coming to Clemson Mr. MacDonald has done a great deal of work to put more knitting machines in operation in the laboratory in addition to his work in the classroom. The knitting laboratory is under a great handicap because of difficulty in securing supplies.

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PHI PSI

Iota Chapter of Phi Psi started the new school year off with the first meeting during the latter part of September. Fifteen of the twenty remaining active student members were present for a general discussion of business. The main topic concerned the plans for new members and initiations. Other subjects considered included the completion of a memorial plaque dedicated to former Clemson textile students. This plaque would be erected in Sirrine Hall. It had been decided during the last semester that by using the school facilities, the work could be done by the chapter members. Through the efforts of the members, a plan has been drawn up and the letters for the pattern ordered.

The second meeting of this school year was held October 16th, for the purpose of electing new members into the fraternity. It was decided to start the initiation on October 27th and to terminate on the 6th of November. The new members include E. G. Berman, Brooklyn, N. Y.; E. T. Broadwell, Sumter, S. C.; J. L. Brown, Hartwell, Ga.; W. M. Chapman, T. N. France, and W. S. Vincent all of Spartanburg, S. C.; R. J. Cheatham, New Orleans, La.; J. R. Conn and L. O. McKee of Woodruff, S. C.; J. G. Connelly, Morganton, N. C.; B. M. Derrick, Irmo, S. C.; A. C. Dorsey and F. F. Griffin both of Greenville, S. C.; W. H. Frick, Newberry, S. C.; J. E. Gardner, Goldville, S. C.; R. L. Garner, Union, S. C.; J. W. Hastings, Chester, S. C.; C. E. Heaton, Anderson, S. C.; T. A. Jeffords, Orangeburg, S. C.; J. F. Livingston, Columbia, S. C.; A. Nuttall and C. E. Parrish, Cedartown, Ga.; T. S. Richbourg, Dillon, S. C.; W. T. Walters, Camden, S. C.

At this point we would like to repeat the purpose of our organization. Phi Psi Fraternity is the largest and most respected textile fraternity in the world. We have always had one of the highest scholastic standings on the campus. It is our purpose to promote scholarship, the mutual advancment of our members and the art of textile manufacturing. One of the things that our chapter is proud of is that we have maintained this high level. One reason is because the cardinal requisite for membership is a specified class standing for all applicants.

The required scholastic rating is a minimum of 4.5 and 4.25 grade point ratio for first and second semester seniors, respectively. A second semester junior must have a 5, while a first semester junior needs at least a 6. All

(See Page 20)

Newly elected Phi Ssi "worms" holding their shuttles as a symbol of entrance into the organization are, left to right, neeling, J. L. Brown, J. F. Livingston, W. Vincent, T. S. Richbourg, L. O. McKee, J. R. Conn, W. T. Waters, C. E. Heaton, J. W. Hastings, and A. Nutall. Standing are T. A. Jeffords, J. L. Heaton, E. T. Broadwell, A. C. Dorsey, R. L. Garner, J. G. Connelly, D. M. Derrick, R. J. Cheatham, C. E. Parish, W. M. Chapman, T. M. France, and F. F. Griffin.

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The Burden Shouldn't Be Born Altogether By Textile Schools

(Continued from Page 5)

pallete, oil and color never produced a painting without the guiding hand and mind of the artist.

To make the statement that "politics" is essential in getting ahead is an insult to everyone that has advanced the ladder of promotion. I am still old fashioned enough (while not old) to believe that Horatio Alger stories do come true. The word ability still has its original meaning, and most times society and business do not fail to recognize and reward ability.

I'm not going to bother to tell the "graduate of 1937" how he can determine if the boss likes him except to say if he doesn't like the boss it is a pretty safe bet the boss doesn't like him. Neither am I going to enter the argument as to "who will make the best superintendent, a spinner or a weaver", except to say that be he either carder, spinner or weaver—if he has managerial ability and what it takes to run a job anyone of the group will be successful when the responsibility is given him. Look at my roster of mill men and explore these men's background. They do not hold their present positions simply because they were carders, spinners, weavers or because they had a pull or because the boss liked them. One word, ability to do a job which someone recognized explains their present position.

A 1947 All-American football team has just been chosen. Were those 11 men chosen because coaches liked them and put them on the team? Were they chosen because they were able to win favor in the eyes of certain sports writers, or because they photograph well? No, they had what it takes. They were blessed with certain physical and mental assets which were developed through attention to detail and hard work, plus experience on the playing field and along with the previous experience of the staff of coaches which developed them. True it is there are many more, given the same training, the same opportunity, would have been just as great, but we do not condemn the great game of football because they were not chosen. No, the game remains great not because boys play to see their names in the headlines and to become All-American, but because they love to play the game.

Certainly there are overseers of spinning, carding, weaving, etc., who have ability and when given an opportunity will be successful on more responsible jobs. Some are textile school graduates, others are not, and still others never went to college at all. Some will get the opporunity, others never will. It is the same in every field of endeavor. To some the opportunity comes early and that star blazes across the sky of success; sometimes only a quick short blaze that is soon burned out—at other times a light that lasts long and contributes much. To others the opportunity comes late and to some not at all. This I think is best expressed in Thomas Gray's "Elegy" written in the country church yard. I quote the 13th and 14th stanzas:

> But knowledge to their eyes her ample page
> Rich with the spoils of time did ne'er unroll;
> Chill Peunray repressed their noble rage,
> And froze the genial current of the soul.
>
> Full many a gem of purest ray serene,
> The dark unfathomed caves of ocean bear;
> Full many a flower is born to blush unseen,
> And waste its sweetness on the desert air.

Chapter for Textile Chemistry Students Organized

BY A. M. HAND

The American Association of Textile Chemists and Colorists is a Natural Organization. It was organized in 1921 with the following purposes.

"To promote increase of knowledge of the Application of dyes and chemicals in the Textile Industry.

"To encourage in any practical way research work on chemical processes and materials of importance to the Textile Industry.

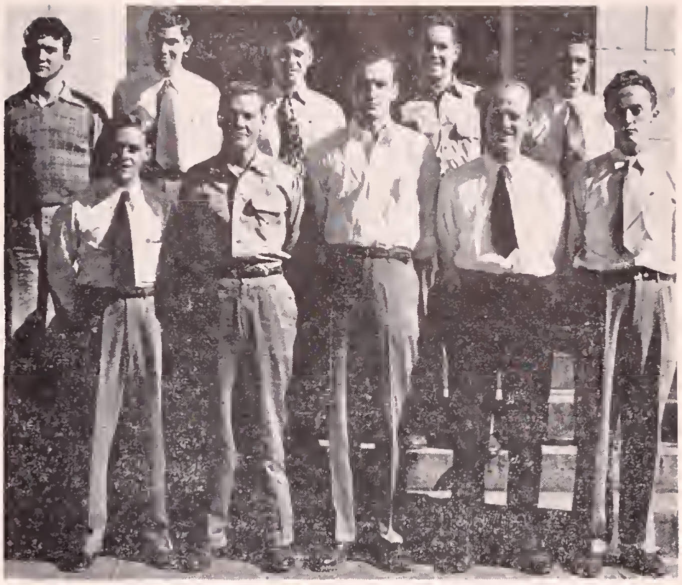
"To establish for the members channels by which the interchange of professional knowledge among them may be increased."

Recently a Student Chapter was organized by the upper classmen majoring in Textile Chemistry. These members are classed by the national organization as Student Members which when graduating will automatically become Junior Members. Student Members receive the same benefits as Junior and Senior members and will receive a copy of the annual Year Book and bimonthly issues of the American Dyestuff Reporter, which carries the Proceedings of the Association.

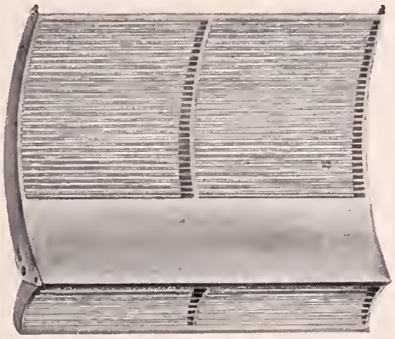
The Student Chapter plans to have three formal meetings during the school year, at which it is planned to have a guest speaker. Approximately two informal meetings will be held monthly.

Professor Joseph Lindsay, Jr., was unanimously elected faculty advisor for the organization.

*AATCC



Members present in picture are (from left to right in first row) J. L. Heaton, R. E. Taylor, A. M. Hand, G. M. Moisson, R. H. France. (Last row) T. A. Jeffords, J. M. Nesius, J. E. Hudson, J. Wilson. (Members not present) A. L. Lefler, J. P. Clancy, W. B. Kelsey, R. N. Westmoreland, A. F. Garrison, A. W. Bloxiham, E. Dyer, G. F. Hemphill, W. K. Fooshe.



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Dan River Training Program

(Continued from Page 7)

more about the men, machines, and concepts for which he is or expects to be responsible.

Once it is decided that the individual possesses the necessary aptitudes and attitudes for potential success and a deal is made, opportunity must be afforded to nurture them. This brings us to the set up and working of a comprehensive training program.

First, let us realistically determine the responsibilities of a manufacturing supervisor and relate them to your training. The importance of this ability can not be over estimated. It makes or breaks a man regardless of his technical know how. As our Divisional Manager Mr. R. E. Henderson, so aptly puts it, "In the future, the man who makes his particular function the most successful, will not be the best engineer, the best scientist, nor the best educated. He will be the man who has learned the art of dealing with people and the basic truths of leadership". Dan River has no elaborate courses in **How to Develop Leadership**, but it does have courses in carding, spinning and loom fixing, which meet two hours a night and two nights a week. In these the trainee actually works with the men over and those who may be under him.

In a typical fixing class you may expect to find the operator on the set of frames next to the ones that you are learning to run on one side, and on the other, your overseer or superintendent, who may be in a student or instructor capacity. It is amongst the grease and gears that the trainees informally learn what some people disparagingly call the "old line" which enables him to get along with folks, both superiors and subordinates. At the same time he gains knowledge of the machinery for which he will be responsible and hence may command the respect of his people.

In the past five years the textile industry has made tremendous progress in managerial technology. Various necessarily complicated cost, quality, personnel and production controls are initiated and installed by consultants, yes, but it eventually becomes the manufacturing supervisor's job to effect them. Knowledge of these is gained in our extensive mill training. The trainee spends, for instance, a month in the Time Study Department. During this time he actually takes time studies, breaks the job into elements, computes normal times, works up his studies, and scientifically determines a reasonable job load. Such familiarity with our labor measurement system will put the potential supervisor in a position to appreciate cleaning schedules, job loads, and direct and indirect labor allowances. From the above you will readily see the desirability of thoroughly mastering your theory courses such as Textile Costing 41 and 42.

An overseer is further responsible for the application of control concepts such as fairly carrying out the specifications of the union contract. Evening school and several days in the Labor Relations Department provide opportunity for the trainee to learn company policy, grievance procedure, and best of all, methods of settling complaints before they become grievances. All other control concepts are briefly presented during the initial four months training period. This includes training in our Purchasing, Production Control, Maintenance, Designing, Accounting, Quality Control, Training, and all other service departments.

An insight into the interworking of the above departments enables the trainee-supervisor to see how his manufacturing operations fit in the goal—production at a profit.

At the completion of four months training, the trainee and management consult and decide for what type of work the man is best suited. The possibilities range from research or sales to production. Since most of you men are interested in production, we might well continue with the production man's training. He will start at the opening room and learn to operate and fix breakers, pickers, cards, and fly frames. To attain skill on these jobs requires another nine months.

The weave room man has the same set-up but with emphasis on warp preparation, weaving, and loom fixing. Finishing plant men work from the grey room through shipping. After being exposed to such a systematic on-the-job training program along with evening school, a man is ready for and is given an opportunity at supervisory responsibilities which vary with the individual from second hand to departmental superintendent. It may well be brought out here that, due to the magniude of our operaions, a second hand at Dan River is comparable to the overseer in a small mill.

The conclusion that may readily be inferred from the above discussion is that scientific selection and a comprehensive training program provide unlimited opportunity for a young man if he is willing to "put forth the effort".

Trainee-Supervisor applicant taking a mental alertness test. When a good overseer walks his job, he must spot such items as weight levers not level, neps in webs, or poorly set harness. He then plans his work to immediately rectify the condition.

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Phi Psi

(Continued from Page 12)

of these must be obtained from an aggregate of the subjects taken at Clemson College.

Scholarship is only the first step. Those with the necessary points are submitted to the members of the chapter to be voted upon; however, no voting ensues until the character and personality of each individual candidate has been taken into consideration.

Phi Psi Fraternity is not only a student activity, but it continues to be of benefit to the members throughout his life in the textile business.

Carefully weigh the requirements and decide for yourself if the extra effort for good grades is worth the advantages derived from Phi Psi.

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Mr. J. E. Sirrine Passes

(Continued from Page 3)

Mr. Sirrine was a modest man. It was his request that there be no dedication service upon the completion of the textile building which bears his name. When the Textile Foundation in South Carolina was named in his honor, he felt it best that he discontinue soliciting funds, but continued his duties as Chairman of the Board for the improvement of

Mr. Sirrine was responsible for much of the capable conviction that more competent instructors were needed to supplement those already in the educational field.

Mr. Sirrine was responsible for much of he capable construction in the textile industry and efficient production of textiles. He was skillful in selecting executives. It was men like him who proved that the South could be and is the best location for cotton and other textile industries.

His gifts are numerous, not only in the form of his great work and philanthropy but the example of his life is worthy of emulation. He never knew of failure, and believed inherently in honesty, thrift and hard work. Even during the last few years of his life when he was ill in health, and finally maimed and partially blind, he continued to come to his office for work. He had done so much good work during his life, and he knew there was much more that he could do for the textile industry of which he was proud.

Ed. note: We wish to thank some of Mr. Sirrine's many friends, Mr. A. S. Bedell, and Mr. L. W. Burdette of the J. E. Sirrine Company; Dr. R. F. Poole and Mr. J. C. Littlejohn of Clemson College as well as the P. & N. and D. & S. Magazine and the Greenville News for their help.

QM Training Available

(Continued from Page 8)

every type of rough treatment a boot would undergo in combat. If the tests or experiments disclose shortcomings or defects the item is returned to the laboratory for additional development.

"Finally, before it is issued to the Army as a standard item, the article is tested under actual or simulated combat conditions. Oversea reports on supply items are carefully studied, the article is modified if necessary, and then when the experts are certain that the item is the best possible from every consideration, its specifications are standardized, and it is procured, stored and issued."

Several colleges throughout the country have been given projects by the Quartermaster General involving the textile, agricultural, and chemical fields. This plan works for the mutual benefit of the schools and the Army.

It is interesting to note that Captain James T. Rhoden, QMC on the Quartermaster Board at Camp Lee, Virginia, graduated from Clemson in 1937 in Textile Industrial Education.

In view of the needs of the Quartermaster Corps for college graduates in textile fields and the establishment of the Quartermaster ROTC at Clemson College, it is felt that an added opportunity for a career has been made possible for the Clemson graduates in Textiles, Agriculture, and Chemistry.

Note: We wish to thank Colonel Albert J. Thackston, Jr., Inf. and Major Walter F. Hall, QMC, for their help in preparing this article.

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NO. 2

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SUMMARY OF WORLD TRADE
By N. S. W. Vanderhoef

MESSAGE FROM THE KNIT UNDERWEAR INDUSTRY
By Roy A. Cheney

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THE COVER MR. GEORGE M. WRIGHT

Mr. George M. Wright, President of the J. E. Sirrine Textile Foundation, an outstanding leader in the textile industry of South Carolina. Mr. Wright came to Clemson April 13th to explain the progress of the Textile Foundation to the faculty of the textile school.

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VAT DYES OF THE DOW CHEMICAL COMPANY

Guest Editorial

By R. M. COOPER

First Director, State Research,

Planning & Development Board;

Now Vice-President of Paintset Fashions, Inc

South Carolina textile mills generally and Clemson textile graduates particularly have played dominant roles in the many recent changes in the industry—changes that have brought about improvement in quality, in distribution and in placing better goods in more homes at lower cost.

Two outstanding developments have taken place. A few years ago, a fully-integrated textile operation under one management was unique; today there are dozens of companies which control the fibre from the opening room to the retail outlet. This means that one centralized group of executives has the responsibility of producing, finishing and converting the cloth and it also means that this same group has to figure on a profit for the entire operation rather than profits on each step in the processing from raw materials to finished goods.

In South Carolina there are numerous examples of the integrated textile system. In the last few years most of these have come into being through consolidations and purchase. Operational control for numerous plants are centered in a small group of highly skilled men. The result has been profitable for the owners, the management and the workers whose wages have climbed steadily. There are, of course, remaining many companies which perform only one of the processes necessary in the industry. They are still important in their fields.

The other development that has tended to modernize the industry has been the tremendous improvement in marketing of textiles. Many mills are now operating their own selling agencies. Included in this group are not only those which have fully integrated processes but also mills which perform only part of the necessary work on raw materials.

One highly-regarded South Carolina textile executive tells me that "the distribution of the products of Southern cotton mills has improved for the benefit of the mills during the past twenty years. There has been more effort and intelligence used in the selling and merchandising of these products. There has been a tendency to get away from the heavier and plainer fabrics and more attention given to styling and finishing. A number of mills have opened their own selling agencies and it appears to be working out advantageously."

Another top-ranking producer also reports there has been a decided change in selling methods for the textile industry in the last 20 years. The trend has been toward mills selling their goods direct.

In 1925, he reports, there were no mill members of the Textile Merchants Association in New York, whereas today over half the membership is comprised of mills which sell their goods direct. "Many mills have nationally advertised brands and most of those whose volume is sufficiently large are either selling their goods direct or have become part of mergers. The mills disposing of their product through old-line commission agents have steadily declined. The few old-line commission agents remaining have modernized their methods and are much more efficient than they ever were heretofore."

Of particular interest to textile students has been the nationwide demand for college-trained workers. Right here at Clemson for each of the 28 men who graduated in textiles in February, there were at least four jobs waiting for them. Last summer there was an average of 10 requests for each of the 50-odd graduates. Comparable conditions have existed at the other textile schools. Today there are about 2,700 men studying textiles in approved colleges and more than 300 are graduated each year. There is room for them and for more, too.

These important developments indicate a bright future for textiles. The combines are more financially able to sponsor important research work out of which will come new methods, new materials, new jobs. Research is the key to the future and should be carried on with vigor to the fullest extent of the industry's resources.

Rayon In Textile Education

No one in the textile industry can underestimate the importance of rayon in the consumer market today. In the hundred years since it was first developed it has become more important than fibers that have been in use for more than 6,000 years. This story is well known. However, attention given to new fibers and their production into cloth, by textile schools is perhaps not as well known. Although there is room for a great deal of progress along these lines, some steps are being taken by the school and by the industry.

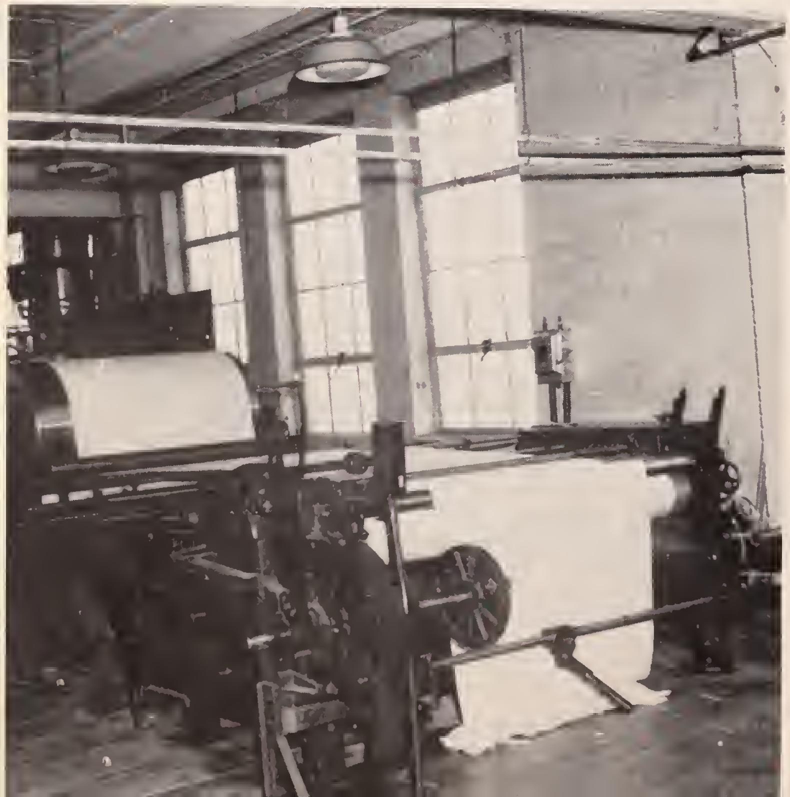
There are specific courses, such as cellulose chemistry, synthetics and finishes which are given in the textile chemistry course. Preparation of rayon pulps and the study of nylon, vinyon, rayons and protein-type synthetics are studied in these courses. Since the fabrication of these fibers is accomplished on modified cotton, woolen or worsted machinery, there are no specific courses, except a seminar in the identification and general information of new fibers. All other study concerning rayon is within the regular courses of spinning, fabric analysis, fabric structure and design, warp preparation, and fabric development.

The school has procured equipment for the use of rayon yarn. This includes the Cocker rayon warper and slasher shown in the picture. There has also been installed in the weaving laboratory a new 50" Draper XD rayon loom. Dr. Hugh M. Brown, Dean of the School of Textiles, has announced that mills are welcome to use the warper and slasher to prepare their cotton and rayon warp.

On a recent visit to Clemson College Textile School, Mr. J. A. White, plant manager Slater Mill, of the Carter Fabrics Corporation, noticed the XD Draper loom and suggested that it might help the student to do some work with rayon. Since he had the same type of looms in his mill, he offered to help the weaving department set the loom up for production as soon as possible. In a short time, not only the materials, but the men to set it up had arrived and the loom was turning out rayon fabric that day. Mr. White sent harnesses, shuttles, reeds, and a loom beam with 4,092 ends of 60 filament, 3 turns, 300 denier dull rayon 1221 yards long. He had supplied acetate, viscose, and spun rayon filling.

It is cooperation such as that given by Mr. White and other individuals in the textile industry that make it possible for the students to obtain a better education and become better prepared for their future in the mills.

The Cocker Slasher which has recently been installed in the warping lab of Sirrine Hall.



Professors Walters and McKenna try the new rayon loo before turning it over to students to use.

World Trade In Cotton Textiles

By N. S. W. VANDERHOEF,

President, Textile Export Association of the United States

President, Turner Halsey Export Corporation

The United States owes its current predominance among world textile industries to one factor alone and that is its technological superiority to all others. Without this advantage world markets would have been lost long ago to nations paying coolie wages, and domestic markets would have been engulfed by a veritable flood of goods from the low-cost manufacturing areas of the Far East.

Maintenance of our leadership in the years ahead will depend solely on technical superiority, for other nations possess real advantages in that their labor rates are much lower than ours while they can purchase their raw materials at prices under those which domestic mills are compelled to pay. It is to the schools and laboratories that mills and exporters look for a steady stream of ideas that serve to reduce costs by raising the productivity of the average worker. It is for this reason that exporters have long been interested in textile education and have constantly encouraged its development here. Now is the time for American schools to develop trained men with more knowledge and more ability than the excellent, but poverty-stricken textile schools in Europe are in a position to impart.

Given a foundation of sound technical training, a textile school graduate can easily fit himself into the export business. Of late, there has been much talk of "tailoring" textiles to meet specific end uses. This technique can be applied to the science of exporting, for more than ever before the peculiar needs of each foreign market must be studied. Goods must be developed to fit the climatic conditions of every country on the globe. It will be recalled that much valuable work was done along these lines by the armed services during the war, when textiles were developed that kept out the damp and cold in the Arctic and stood up in the heat and wet of the jungles of the South Pacific.

Added to this task is the job of developing textiles that will appeal to the consumers all over the world. This involves the study of preferences in the Caribbean Islands, Central and South America, Africa, Middle East and Far East. Most of these preferences are rooted in national cultures which also should be studied by anyone planning to embark on an export career. There was a time when these likes and dislikes would be disregarded but that period is drawing to an end. From now on retention of export markets will depend on giving them the goods they want. European producers have always done this whereas there has been a tendency on the part of American mill men to regard foreign markets as outlets for surpluses that could not be digested by domestic markets.

Over the last seven years, since Pearl Harbor, there have been profound changes in world trade in cotton textiles. Neither Great Britain nor Japan is likely to recapture in the foreseeable future the predominant position they held in world markets in prewar years. The position of Lancashire is hard to appraise, for the industry since the outbreak of World War II has not only had to contend with disruption of external relationships but has undergone a complete internal change. While the industry has not been nationalized in the same manner as the British railroads, coal and steel industries, it may as well be for its manufacturing and merchandising operations are under government supervision.

Also, Lancashire is faced with the problem of adjusting itself to an altogether new set of trade relationships. As an example of this, one need look no further than Asia which for decades absorbed tremendous quantities of British textiles. A great political revolution has brought into being new governments in India and Burma and Ceylon and may produce others in Indo-China and Indonesia. The great dominions—Canada, South Africa, Australia—are not only showing a preference for American styles and qualities but seem intent upon building textile industries of their own.

Japan lost more than 75 percent of its equipment during the war and is now operating about 2 3-4 million spindles. Plans are afoot to raise capacity to four million spindles over the next year or so. Japan presents a ticklish problem in that it can easily become the commercial terror it was ten years ago. Its textile machinery and spinning industries are efficient and well staffed and have had long experience in catering to world markets. Given financial aid from other foreign governments or banks, the industry can be restored to its prewar efficiency in less time than it will take the American industry to replace its war-worn equipment. If however, Japan is to hold down to less than four million spindles and the distribution of its products restricted to its historic Far Eastern markets, world textile markets will continue to function in a stable and orderly manner.

Due to cataclysmic political changes, Europe as a whole is highly unlikely ever again to play the role in textile foreign trade that it did before 1939. While the German textile industry was not damaged as badly by bombing as many suppose, it is divided, with Russia controlling one part and United States and Britain the other. Poland and Czechoslovakia are behind the Iron Curtain and will never regain their one-time prominence in textiles

(Continued on Page 6)

Is the Textile Worker Human?

By G. M. MOISSON, JR. '49

(ed. note—An article by a student for the students)

Perhaps this magazine is not the proper place to express my views of personnel problems, but it is the only means at my disposal.

Why do professors stress repeatedly the necessity for the young graduate to "study the hands;" to learn their language; to refrain from offending them? Is it because the textile worker is a subnormal being, incapable of being understood, not socially equal to his supervisory staff? Or, is the **real** reason this: that the "young graduate" is himself a too-wise, inexperienced, and cocky individual, who, by his lack of understanding, quickly antagonizes any old-timer with whom he is working?

During the last depression I was knocked violently from my pedestal and was forced to go to work in a textile dyehouse in order to contribute my share to the family grocery bill. In that dyehouse I learned that I too could stink and sweat as much as any other worker. I learned more than that. I learned that the boys in the dyehouse, the old men and women at the looms, and the crippled night-watchman were human beings, capable of profound thought and well deserving of respect! Since that time one of the watchmen has been ordained a minister; one of the dyehands has gone into business for himself and has put three children through college; one of the girls in the finishing room has established a prosperous dry cleaning business; others have risen in the mill to positions of responsibility. There is no reason on earth to set these people as a class apart!

Why go to college then, if college education does not equip you with the ability to handle and to understand people? There is only one answer to that: learn at school what is taught there; learn as quickly as possible after graduation that **you** are just another "new- hand" in the mill! Don't flash that Clemson ring too much; it merely leads you to the door of opportunity—your personality is the key; see that it fits!

WORLD TRADE IN COTTON TEXTILES

(Continued from Page 5)

until they shake off the smothering effects of Russian influence. The future of France and Italy as textile producers has brightened as a result of the success of their governments in overcoming the recent assaults by Communists but both countries have yet to reach that degree of political stability in which industry can flourish.

While the next few years will continue to witness a lessening of European and Asiatic competition, as compared to prewar, it will be marked by increasing competition from Latin American countries. These traditional markets for American goods are industrializing at a rapid rate. Brazil and Mexico, for example, have reached the point where they can not only supply their own needs but are able to compete for export business. Brazil during the last year concluded bilateral agreements with its neighbors which give its textiles preferred treatments in such important markets as Argentina and Chile. This trend toward self-sufficiency in Latin-America will produce a host of difficulties for American exporters over the next few years. Important textile industries there are demanding more protection and are getting it. A straw in the wind was the refusal of many Latin-American delegates in the Havana conference to compromise on the subject of quotas. Anyone experienced in foreign trade knows that quotas are more effective than even the highest tariffs in halting the flow of goods to foreign markets.

This, of course, is but a brief summary of world trade development that the Textile Export Association is seeking to appraise. They add up to the obvious conclusion that American textiles will continue to sell in volume until political stability is achieved in Asia and Europe but that the prewar pattern will never be renewed.

At present the United States is the world's leading exporter of cotton textiles. Its relative position is illustrated by the following table:

WORLD EXPORTS OF COTTON PIECE GOODS
(Million square yards)

Country	Avg. 1934-38	Est. 1947
Americas		
United States	234	1,500
Canada	—	20
Mexico	11	90
Brazil	—	70
sub total	245	1,680
Europe		
UK	1,833	550
Belgium	159	130
Czechoslovakia	669	30
France	364	250
Germany (Bizonia)	149	10
Italy	312	115
USSR	201	0
Netherlands	150	65
Other Europe	128	380
sub total	3,365	1,530
Asia		
India	205	240
Japan	2,563	400 (lin. yds.)
Other	153	50
sub total	2,921	690
Total	6,536	3,900

The Knit Underwear Industry

By ROY A. CHENEY

President of the Underwear Institute

The knit underwear industry, which will be the subject of this little article, is not so old as its brothers in the textile industry, as knitted underwear did not receive much of an impetus in production until about the time of the war between the states. It was founded in this country in New England, as most of our textile industry in this country was, although New England got its inspiration and its first machines from old England. The textile manufacturers must have always been association-minded because this association was founded in 1864 and has been in continuous operation ever since.

Knitted underwear is most generally made on circular knitting machines and comes off the machines in the form of tubing. These types of machines utilize all fibres, viz., cotton, wool, rayon, nylon, silk, etc. On this circular knitting machine you can produce a ribbed fabric or a flat fabric, the former stretching more readily than the latter, although the latter has more elasticity than woven materials

The second great type of knitting machines are known as warp knitting machines, which combine the art of weaving with that of knitting, in that a warp has to be used in the manufacture of the product. Warp knitting, so far as underwear is concerned, is confined mostly to rayon and nylon as its materials, although an increasing amount of cotton and wool knit fabric is now being produced, mainly for the fabric glove trade.

The fabrics coming off the warp knit machines are most popularly known as tricot and milanese.

There is a third group of machines, very few of which comparatively speaking are in this country, known as interlock machines, which make a very fine, yet very sturdy fabric for use in underwear, but mainly in outerwear and pajamas.

One of the drawbacks to knitted underwear has been its shrinkage under adverse laundering conditions. The same was true of woven fabrics until the Sanforizing process was developed and made commercially available. It is very interesting to know that a new machine has been developed which will do the same thing for knit goods that Sanforizing does for woven goods. It is expected that within a year these machines will be commercially available and knitted garments offered to the public with certainty that residual shrinkage indicated on the labels will be maintained. This new method of preshrinking has to do mainly with taking out the relaxation shrinkage left in the fabric after mass production. It is different from the anti-felting wool shrinkage treatments which have been recently developed and have come on the market not so very long ago. The wool anti-felting shrinkage process is mainly a resin or chlorine treatment and has been proven highly satisfactory by many tests given to it by the Army. The Army also is testing the new process of relaxation shrinkage and has found very desirable results.

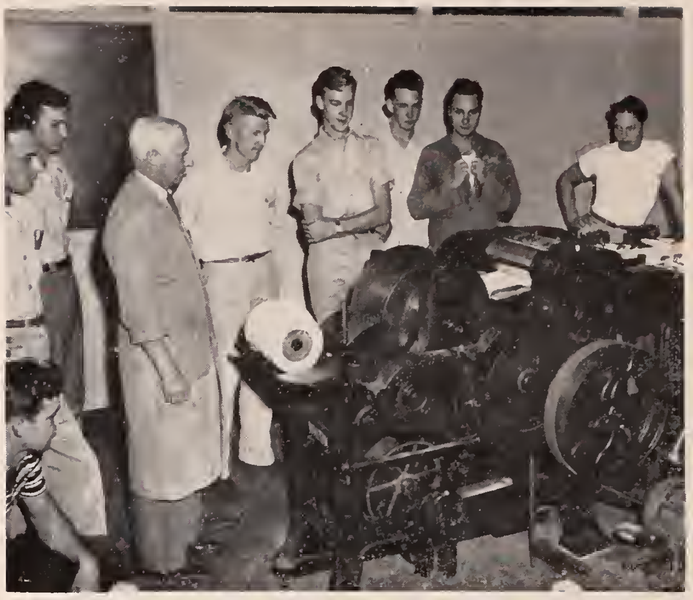
The largest production of knit underwear is found in the Middle Atlantic States, viz., New York, Pennsylvania, etc. The South comes next, with New England third, and the Middle West fourth. The South, however, is growing in its production of knit goods and in my opinion will see even a larger growth in the next few years. Some of our southern mills are making the highest possible quality knit underwear and sportswear, which will compare very favorably and on an equal basis with the best quality product here and abroad.

The knit underwear industry is made up mostly of comparatively small mills located as a rule in small communities.

The industry made a tremendously fine record during the war and delivered to the armed services all the underwear needed, when it was needed and where it was needed. Luckily the industry did not expand to any appreciable degree during the war. In fact, the queer and strange rules of the Office of Price Administration forced several mills to close their doors. The result is that from those causes and the increase in the population I believe a proper balance has been reached between production and consumption of knitted underwear, and unless some unforseen emergency occurs I look for many years of prosperity ahead of the industry.

There is a real need in the underwear industry—as I imagine there is in most industry—for capably trained young men to enter the business as junior executives, and we are looking to great and outstanding schools like Clemson for the type of men we would like to have in our industry.

New Textile Courses Of Study



One of Professor W. G. Blair's laboratory classes in combers for textile students.

In the last issue of this magazine we mentioned some additional pieces of equipment being added to the Clemson College School of Textiles in an effort to keep the training on the highest possible level. We also introduced the new members of the school faculty who are not only improving the teaching, but make it possible for the textile school to increase the enrollment so that the demand for more and better trained men by the textile industry may be met.

In this issue we shall endeavor to present some of the changes in the academic program that have been made in the last few years. Since the completion of the war, Clemson College has initiated two new courses, textile manufacturing and textile engineering. There have been minor changes in the textile chemistry course to meet some of the changes that have taken place in the industry, the two previously mentioned courses represent an almost entirely new approach. The reason that this subject is taken up at this time is that the graduating class will now contain a large number of men who have completed these new courses. We feel that such an article may be of interest to new students, and students who have not completely made up their minds as to what course of study they want and also the men in the textile industry who want to know just how the Clemson graduate is being prepared for work in the textile field.

It is hoped that textile men may have suggestions to offer for improvement of the courses of study, because they are in the best position to know how the men entering the industry should be prepared. There will, however, be some conflicting viewpoints, and the school should be able to include both points or strike the happy medium. Of course it is realized that the employer hires the man, not the degree, but there is always room for improvements in training.

—V—

THE TEXTILE MANUFACTURING COURSE

The course of textile manufacturing follows the course of study similar to the previous textile engineering, with the exception of the few engineering courses that were dropped and textile subjects substituted or expanded. Fabric Structure and Design, Time Study, Physical Textile Testing, and Fabric Development have been added and other subjects changed and enlarged. The technical textile subjects together with the general science subjects are designed to equip the student with a background suitable to enter a textile organization and qualify for working in a job related to manufacturing textiles with a minimum of instruction for advancement.

The subjects taken during the first year of this course give the student instruction of a general nature, to develop his background. The classes are in general chemistry, engineering drawing, composition and literature, American national government, mathematics, and an introduction to textiles.

During the second year, studies are taken in economics, literature and advance composition, general physics, with textile courses consisting of fabric design, cam loom mechanics, blending and cleaning, and carding.

The junior and senior years are made up principally of textile subjects which cover fabric structure and design, fabric analysis, dobby and box mechanics, jacquard mechanics, knitting, roving frames, spinning frames, cotton marketing, combing, and organic textile chemistry, chemical processing of textile materials, warp preparation, fabric development, costing, management, time study and textile testing. Other classes in public speaking, business law, accounting, and elementary sociology are required as well as a few subjects which left to the students election.

—V—

THE TEXTILE ENGINEERING COURSE

With the immense growth in production of the textile industry and the intense competition of this business in normal times, there has been increased demand for men with specialized training. There is more and more engineering being used in textile production. If the outlined training does not suit a man for the direct application of this course, he will be acquainted with the fundamentals of electricity, steam heat, machine design, etc.; and will be more cognizant with this work being done in mills. This fact probably is the general reason for a course such as textile engineering. Training of this type will have direct application not only in textile machinery firms, research organizations in mills and for graduate work, but also in the production of textiles.

In a past issue of the DAILY NEWS RECORD, Mr. H. W. Anderson, in discussing the value of the graduate engineer in a manufacturing plant said, "the most important element of an engineering education is emphasis placed upon logical reasoning. A profession based upon mathematics is one of the first and last calls for sound logical reasoning. A well-trained engineer graduating from a top flight engineering college receives an education that makes him most appreciative of the contributions made by labor in industry. His observations become practical ones which particularly lend themselves to dealing intelligently with every manufacturing strata."

Some mills have found it worth while to employ engineers, many of whom may have graduated in mechanical or some other type of engineering and later trained in textile manufacturing. This new course in textile engineering provides the student with both an engineering and a textile manufacturing background.

The first two years of study are identical with the other branches of engineering offered at Clemson. During the last two years, courses in mechanism, machine design, direct and alternating electrical circuits and machines, static kinetics, and strength of materials, mechanics, and a mechanical engineering heat-power course in thermodynamics. These engineering courses are taken in the engineering building with men who are majoring in mechanical engineering. In addition to the engineering subjects, however, basic work in textiles is covered by such subjects as blending and cleaning, carding, fabric design, cam loom mechanics, roving and spinning frames, costing, management, time study, dobby and box mechanics and testing.

A comparison of the two courses shows that the textile engineering course does not require eleven textile courses that are required for textile manufacturing. They are introduction to textiles, fabric structure and design, fabric analysis, knitting, jacquard mechanics, combing, cotton marketing, warp preparation, fabric development, textile organic chemistry, and chemical processing of textile materials. It would be possible for a great many students to elect almost eight subjects many of which could be these textile courses not required. Other students may prefer to take some electives in the school of general science or maybe in the engineering department, studying air conditioning or other courses in English, economics, and psychology.

One of the electrical engineering laboratory classes for textile and mechanical engineers.

The student in taking this engineering course sacrifices the above mentioned textile courses but he gains a working knowledge of electricity, the theoretical and practical aspects of its application. Therefore, this should be of importance in a mill considering the large amount of electricity used. There is also gained an understanding of some of the scientific principles concerning steam heat. Instruction and practical work on the basic power machines in the machine shop is given. The work and value of the machine shop in the mill is learned here. Also included is a short course in machine design, which gives the student an insight into some of the problems that present themselves when developing machines of a general nature, not necessarily textile machines; but the professor is always willing and interested to discuss textile machines with anyone who shows enough interest. When designing machinery it is necessary for the student to make decisions and use ingenuity.

These two new courses for the processing of textiles, are primarily designed to supply the industry with better prepared graduates, and men with different backgrounds to fit into the various phases of the textile industry. The student is also offered alternatives so that he might be able to choose the type of subjects he thinks would be preferable to him. It is believed that these courses cover the essential points of processing all fibers into a fabric. Certainly the courses outlined are not static, but will be changed from time to time as the school administration and the industry believe would be best.

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PHI PSI

VISITATION BY HAROLD H. HART

During the later part of the last semester Iota Chapter of Phi Psi Fraternity was honored by a visit from the National Executive Secretary, Mr. Harold H. Hart. During his visit here Mr. Hart took charge of the meeting at which the chapter conferred honorary membership upon two members of the faculty of the Clemson College Textile School.

After the initiation the members of the fraternity welcomed the new members and formally met Mr. Hart. At the close of the meeting, refreshments were served and an informal discussion ensued. Mr. Hart was one of the five students of the Philadelphia College of Textile Engineering who organized the Phi Psi Fraternity on March 18th 1903. As stated in the constitution the purpose of the fraternity is to promote good fellowship, social intercourse, mutual advancement of its members and the art of textile manufacturing.

Mr. Hart explained that he was making a trip to some Phi Psi Chapters in the South. He had just come from a visit to Eta Chapter at North Carolina State College, at Raleigh, and had planned to go to Theta and Lambda Chapters at Georgia School of Technology at Atlanta, and Alabama Polytechnic Institute at Auburn, respectively. He said that he was enjoying his visits to the Southern Chapters and was happy to find them in a healthy condition. He also told the members that the next national convention would be in New Bedford, Massachusetts May 14, 15, 16 of this year. He promised that there would be a fine program and a good time for all during that weekend.

Those who were privileged to spend some time with Mr. Hart while he was at Clemson were entertained by his philosophy, which was only surpassed by his wit. He had many interesting stories to tell of his school days. He said that he was nearly fired several times for some of the pranks he participated in and instigated. He also told of his experience in the textile industry, and of his many interesting friends.

The members of Iota Chapter enjoyed his visit very much and hope that he will be able to visit the chapter again soon.

———V———

INITIATION OF HONORARY MEMBERS

At the meeting at which the National Executive Secretary presided, initiation of Doctor James H. Langston, Associate Professor of Textile Chemistry and Dyeing and Mr. Arvid Czarnitzki, Assistant Professor of Textile Chemistry and Dyeing, to honorary membership in Phi Psi Fraternity took place. Two honorary memberships are given each year by each chapter to men who are associated with the textile industry who are not undergraduates. Honorary memberships are only given upon unanimous approval of all active members of the chapter.

Doctor Langston joined the faculty in September, 1946. He received his A. B. degree from Stephens F. Austin State Teachers College of Texas, and his M. A. and Ph D. at the University of North Carolina. Mr. Czarnitzki also joined the staff in September 1946. He received his B. A. degree at Newberry College, and his M. A. at the University of South Carolina. Both professors are well known around the school, holding classes principally in organic chemistry.

———V———

PHI PSI ACTIVITIES THIS SEMESTER

L. P. Batson Jr., Textile Engineering senior from Greenville who was elected Vice President of the chapter at the last election, has taken over the duties of President because of the graduation of President R. B. Willey.

At the first meeting of this semester thirteen students were chosen for membership in the fraternity. These students were R. Anderson of Greenville, M. M. Clinkscales of Abbeville, J. C. Rair of Greenville, F. P. Hammond of Greenville, R. M. Hicklin of Richburg, C. R. Howell of Greer, F. K. Jones of Newberry, W. D. LeGrand of Greenville, W. E. McSwain of York, C. R. Martin of Pendleton, G. M. Moisson, Jr. of Greenville, G. E. Uldrick of Donalds, and R. N. Westmoreland of Winston-Salem, N. C.

———V———

ANNUAL SPRING BANQUET

The Iota Chapter of Phi Psi Fraternity at Clemson College held its annual spring banquet at the Hotel Greenville, April 30th. Mr. David Clark of Charlotte was the guest speaker. His subject was "The Background of the Textile Industry of the South."

Mr. Clark is well known in the textile industry and has long been associated with the industry in the South. He is President and Editor of the **Textile Bulletin**, one of the outstanding textile magazines.

This annual banquet affords the active members in the textile school and the alumnae members of the faculty and in the industry to renew old friendships.

The new officers of the chapter were announced. They are F. F. Griffin of Greenville, President; R. J. Cheatham of New Orleans, La., Vice President; E. T. Broadwell of Sumter, Secretary-Treasurer; G. M. Moisson of Greenville, Senior Warden; R. N. Westmoreland of Winston-Salem, N. C., Junior Warden.

There were approximately ninety people at the banquet, which included active and Alumni members and their guests. Entertainment was supplied by a magician, Mr. Moody of Woodside Mills.

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Policy—

The views and opinions expressed in all guest articles are those of the writers themselves, and must not be construed to necessarily represent the views and opinions of the Editors of this magazine or of the Faculty of the Clemson College School of Textiles.

WARWICK CHEMICAL COMPANY AWARDS SCHOLARSHIP TO CLEMSON COLLEGE

Mr. Ernest Nathan, President of Warwick Chemical Company and President of the Warwick Chemical Foundation announced that a three thousand dollar endowment would be awarded to Clemson College in memory of Manfred Ceranci, a member of that organization who was killed in World War II.

The Warwick Chemical Foundation also awarded two other like endowments as memorials to members of the Warwick Chemical Company who gave their lives in the last war. In memory of Walter Nowicki an endowment was given to Lowell Textile Institute and an award was made to the Philadelphia Textile Institute in memory of Walter W. Lane.

———V———

THANK YOU

The staff of the BOBBIN AND BEAKER wish to thank those men in the industry who have taken the time and trouble to prepare articles for this and other issues of this publication. It also wishes to express its appreciation to the advertisers who make this publication possible.

In our last issue the Training Department Staff of Dan River contributed a fine article concerning that organization's training program. In this issue we feel that we were again fortunate and received articles from such distinguished men as Mr. R. M. Cooper of the South Carolina Research Planning and Development Board; Mr. N. S. W. Vanderhoef, President of the Textile Export Association of the United States and President of Turner Halsey Export Corporation; Mr. Roy A. Cheney, President of the Underwear Institute. These articles were extremely interesting and enlightening to us. We would also like to thank Mr. John T. Wigington, Director of the Division of Technical Service of the Cotton Textile Institute who gives us invaluable help and assistance.

We feel that these men who are so much a part of the textile industry are responsible for the success of this project. They make this magazine worth reading for the practical information contained herein. It is our hope that the student will find this information as valuable as the theory that he receives in the classroom.

We believe that it is a fine thing that these men, as well as the advertisers, have felt that is was worthwhile to help the students publish a good magazine. It is hoped that the people in the industry will continue to show interest in the textile school as they have in the past.

It is also fortunate for the textile school to have men such as Mr. J. A. White, of Slater Mill, interested and willing to help the school (article page 4). Many mill suppliers too, have assisted the textile school and faculty in giving the students the best possible training.

We would also like to express our appreciation to the Altman Printing Company of Anderson, S. C., and the Charleston Engraving Company of Charleston, S. C., for the patience they have had with us amateurs in the publication field and for the fine work we have received from them.

Editor

———V———

SIRRINE LIBRARY

A book recently added to the reference library in Sirrine Hall is the TEXTILE BRAND NAMES DICTIONARY published by the Textile Book Publishers, Incorporated, 303 Fifth Avenue, New York. Copyrighted in 1947, this book contains 380 pages, its size is 6 1-2x9 1-2, red cover, and sells for $6.00.

The book contains information of over 4,000 fibers, yarns, and cloth brand names, together with an illustration of the trade-mark of each.

There are three main sections of the book. The first part contains an alphabetical listing of the brand names, the illustrated trade-mark, name, serial number of the patent, the manufacturer, and location, date the patent was filed, what kind of product the trade mark is used on, with the fibers used in the construction and the date the claims were used. This information was first published in the OFFICIAL GAZETTE of the United States Patent Office, then compiled in the RAYON TEXTILE MONTHLY as a regular feature. The information in this book was published previously between 1934 and the early part of 1947.

The second part is a classified arrangement of textile brand names under 12 textile headings, which are: coated fabrics, cotton goods, knits and laces, linen goods, nylon, pile fabrics, rayons, ribbons and elastics, silks, synthetics, wool and worsted goods, yarns and threads.

Part three is an index of companies owning the brand names listed in the first part and giving the page numbers. V. Alexander Scher of Richards & Geier, patent and trade-mark attorneys, New York City, has written the introduction suggesting how to choose a brand name and how to register a name and trade-mark with the Patent Office.

This dictionary has many applications in the textile industry. Some examples of its use may be for the identification of brand names, fabrics, and the companies to which they belong. It should also prove valuable when choosing a new brand and trade-mark and having it registered.

Another new book just placed in the library is the second edition of the AMERICAN WOOL HANDBOOK by Werner von Bergen and Herbert R. Mauersberger, copyright 1948. Published by Textile Book Publishers, Incorporated. Format 5 1-4"x7 5-8". It is illustrated with various types of wool bearing animals, enlargements of fibers, diagrams, tables, graphs, charts, and machinery used for all processes. It contains 1,055 pages including an index and is bound in green cloth cover with silver lettering. It sells for $8.00 in the U. S. and Canada.

Everyone in the industry is familiar with the first edition that was published in 1938 which was very popular. This edition has 24 chapters, one more than the first edition and 175 additional pages of text. This new edition is a revision and expansion of the first edition to take

(Continued on Page 16)

Additional Service For Mill Employees

In the last few years textile mills that are established in small communities have found that they can perform a useful and needed service to their employees by establishing self service laundry units. Many mills in this section of the country are unique in that they have mill villages, or that one mill is the principal industry of the community, therefore anything that is done for the improvement of the village and the convenience of the townspeople indirectly helps the mill.

Because textile mills employ a great many women, the weekly wash for the family presents quite a problem. Many mill communities are too small to make a commercial laundry profitable, however, the installation of several automatic washing machines, and automatic dryers makes a laundry service possible for the average family at a nominal cost. The hard and tiring job of doing the weekly family wash can easily be done now by taking the week's wash to the self service laundry store and calling for it later. The washing machine automatically tumble-washes, triple rinses and damp-dries the clothes in a matter of thirty minutes. There is also a special setting on the machines which makes it possible to wash blankets, woolens, silks and other fine things in eighteen minutes.

Laundering stores can be equipped with six or more machines. Estimated cost of establishing a twenty machine installation on leased premises is said to range from $7,500 to $13,000. It has been figured that the entire investment can be amortized inside of three years. The practicability of economically establishing such a laundry service as this lies in specialization, simplification of services and methods of pricing, plus the efficiency of production. The minimum space required for twenty machines would be 14 by 45 feet and an additional utility space for heaters, softeners, and storage.

An example of a successful self service laundry run by

(Continued on Page 14)

Specialties for the . . .

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ADDITIONAL SERVICE FOR MILL EMPLOYEES

(Continued from Page 13)

a mill for the convenience and economical laundering of its employees is the Washeteria established by the Pacolet Manufacturing Company. Mr. T. J. Trowell, Personnel Manager, has informed us that "on the 26th of May 1947, the Pacolet Manufacturing Company began the operation of a Washeteria in a centrally located place. Ten Automatic Washing Machines were installed, and later an Automatic Dryer was added.

"Each machine holds nine pounds of dry clothes, and completes the wash in thirty minutes. For each there is a charge of thirty-five cents, and if the customer wishes her clothes dry there is an extra charge of five cents per wash. This makes the family wash average around a dollar per week.

"There are two regular machine operatives. One pick-up driver is used to collect the laundry in certain areas of the village on certain days. He returns the clothes rough-dried to the customer within eight to ten hours.

"The Washeteria served about twenty families the first week of its opening and has grown steadily, until ten machines are not adequate to care for the present requirements, and it is altogether possible that several more machines will be needed to care for the increase in growth.

"Besides the regular family washes each week the Athletic Association uniforms and the towels for the Mill Schools, the Y. M. C. A. and the mills are also laundered.

"All profits derived from this Washeteria is returned to the employees in some form of entertainment or recreation."

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Product Displays In Sirrine Hall

Shown here in pictures are two showcases which have been installed in the hallways of the Textile Building. These displays dramatically exhibit some of the products of the textile industry. They give the students and visitors an idea of the fabrics that are being made by Dan River Mills, and Burlington Mills. They also do much to embellish the interior of the building.

It is hoped that other manufacturers will consider putting displays in Sirrine Hall so that their products may be represented too. These showcases are in the hallway connecting the center entrance of the building with the Dean's office.

New Professors - -

The staff again takes pleasure in introducing to the readers two more additions to the faculty of the Textile School of Clemson College. The textile school now has seven hundred and three students and twenty six teachers, of whom seven have received Master's Dgrees and three have received a PhD.

R. C. LATHEM

Professor Lathem has worked in the steel as well as the textile industry. In 1933 and 34 he worked as a U. S. Steel salesman and in the inspection department. He went to Auburn in 1935, '36, '37 and then he worked as a mechanic and in the tin house until 1940. He received a B. S. degree in 1941 in Textile Engineering at Auburn, and was a member of Phi Psi and Lamdba Chi Alpha fraternities.

He then worked for Avondale Mills from 1941 to '43 in the costing department at Sylacauga, Ala., and as production manager at the Birmingham, Ala., plant. He was superintendent of learners for Pacific Mills in 1943 and '44. In 1944 and '45 he was assistant to the superintendent of Avandal Mills in Birmingham, Ala. From 1945 until the time he came to Clemson, Professor Lathem was plant survey engineer and overseer of Spinning for Dan River Mills. He is married and has a step-son.

—V—

E. A. LAROACH

Profssor Evans A. LaRoche is a Clemson graduate, who has returned to Clemson after nearly six years absence. He was a member of the class of '42 and received a B. S. degree in Textile Engineering. While a student at Clemson, Professor LeRoche was a member of Phi Psi, Phi Kappa Phi, and Beta Sigma Chi Fraternities.

After graduation he entered the service and was in the Army for three and a half years. Upon discharge Professor LaRoche worked at Watts Mills in Laurens, S. C., from March 1946 to March 1948. He now lives here with his wife and son.

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(Continued from Page 12)

care of the changes that have taken place in the woolen and worsted industry. In addition to the thorough treatment of the basic material in the book, several flow sheets on yarn manufacture, and dyeing and finishing processes have been added in the new edition. Separate chapters have been devoted to the chemical properties and the marketing of wool, the manufacture of carpets and rugs, woven and non-woven felts and a complete bibliography. The labeling act and the new tariff schedules are included. The testing chapter has been enlarged stressing quality control. Many new photomicrographs, machinery and other illustrations have been added. The many valuable features of this book demonstrate the extent to which the authors have gone to make this the finest handbook in the wool industry.

The authors, Werner von Bergen and Herbert R. Mauerberger, were teachers in the Extension Division of Columbia University. The former was a consultant to the Quartermaster General during the war, and presently director of research of Forstmann Woolen Company. The latter is presently textile consultant and president of the Textile Book Publishers, Incorporated.

Arthur Besse, President of the National Association of Woolen Manufacturers, has again written the foreword to this book and terms it "a most comprehensive study of the wool textile industry with special emphasis on existing American practice." Twenty specialists in various phases of the business collaborated in the preparation of the text which has been in preparation for over two years. The authors have adhered to the same excellent presentation as was used in the first edition.

There is no doubt of the importance of this book to the men of the textile industry. It should also prove to be useful to the students here at Clemson even though we do not have courses in woolen and worsted manufacturing, the subject of microscopy does include the study of animal fibers. Students interested in learning the difference in production, dyeing, and merchandising woolen and worsted fabrics and that which is taken up in their courses will find the AMERICAN WOOL HANDBOOK essential.

WHERE SOME OF OUR TEXTILE GRADUATES ARE LOCATED

(ed. note: This feature, which appeared in the 1943 BOBBIN AND BEAKER, is being continued by request. We shall include as many graduates as possible in each issue.)

E. T. McIlwain '47, Training Program, Fulton Bag & Cotton Mill, Atlanta, Ga.

W. E. Broadwell '47, Graduate Student, Institute of Textile Technology, Charlottesville, Va.

H. L. Jones '47, Apprentice, United Merch. & Mfg., Bath Mills, Bath, S. C.

M. D. Lindsay '47, Control Laboratory, D. E. Converse Co., Glendale, S. C.

L. A. Crawford, '47, Asst. Superintendent, Joanna Cotton Mills, Goldville, S. C.

D. W. Quinn, Jr., '47, Self Mills, Ninety Six, S. C.

T. C. Perry, Jr., '47, Textile Engineer, Pepperell Mfg. Co., Apelika, Ala.

H. B. Turner, '47, Purchasing Agent, Magnolia Cotton Mill, Magnolia, Ark.

R. M. Phillips, '47, Asst. Foreman, Starch Dept. American Finishing Co., Memphis, Tenn.

W. E. Lindsay, '47, Warping, Republic Cotton Mills, Great Falls, S. C.

F. Jackson, Jr., '47, Control Lab Tech, Standard-Coosa-Thatcher Co., Chattanooga, Tenn.

W. D. Clark, '47, Sales Engineer, E. H. Jacobs Mfg. Co., Danielson, Conn., and Charlotte, N. C.

W. E. Blackmon, '47, Research Dept. Springs Cotton Mills, Lancaster, S. C.

R. B. Toms, '47, Ely & Walker (Calhoun Mills) Calhoun Falls, S. C.

G. P. Robinson, '47, Card Grinder, Springs Cotton Mill, Lancaster, S. C.

M. D. Heaton, '47, Lab Tech, J. P. Stevenson & Co. (Piedmont Mfg. Co.) Piedmont, S. C.

R. F. Sherriff, '47, Asst Dyer, Burlington Mills, Burlington, N. C.

D. A. Watson, '47, Textile Chemist, Southern Bleachery & Print Works, Taylors, S. C.

W. S. Baker, Jr., '47, Salesman, Baker Motor Co., Greenville, S. C.

J. R. Clark Jr., '47, is with the Chicopee Mfg. Co., Walhalla, S. C.

V. R. Mills, '47, is with Dan River Mills, Danville, Va.

J. M. Perry, '47, Dyeing and Finishing Dept., Stonecutter Mills, Spindale, N. C.

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BOBBIN & BEAKER

STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

VOL. 7 FALL ISSUE, 1948 NO. 1

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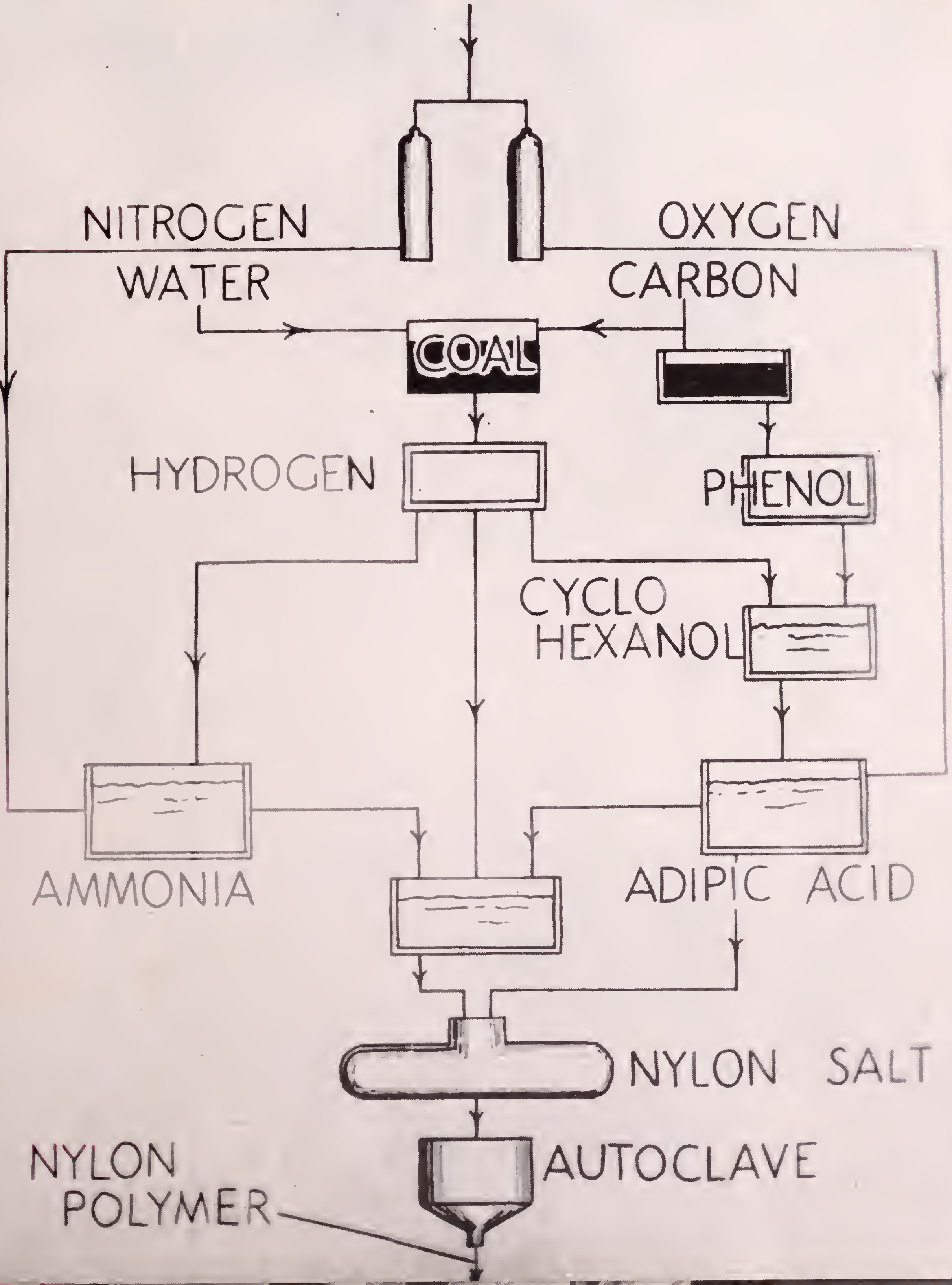

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THE

BOBBIN and BEAKER

Official Student Publication
Clemson Textile School

Vol 7 Fall Issue, 1948 No. 1

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THE BOBBIN AND BEAKER. Organized in November 1939 by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge twice during the school year by students of the Clemson College School of Textiles.

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THE COVER. "Diagrammatic Sketch of Nylon Manufacture" Part of Visual Aid Technique of teaching used in Clemson's Textile School.

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Textiles Through the Microscope

T. L. W. BAILEY, JR.—Mr. Bailey received his B. S. degree from Clemson Agricultural College in 1926, and remained three years to work on cotton investigations in the South Carolina Experiment Station. This program was concerned with influencing fiber development in the cotton plant in desired directions.

From 1929 to 1941 Mr. Bailey was Cotton Technologist with the U. S. Department of Agriculture. When the USDA set up its regional program he was assigned to the Southern Regional Research Laboratory in New Orleans as Fiber Microscopist. He served in this capacity from 1941 to 1946. Now employed as Research Microscopist at the Institute of Textile Technology, Charlottesville, Virginia. Mr. Bailey is a recognized authority on fiber structure and fiber miscroscopy in general, with cotton as his specialty. In this field his work has attracted international attention. His photomicrographs of cotton fibers and yarns as compared with rayon and synthetic fibers visualize the invisible in ways as striking as they are informative. His published technical bulletins and scientific papers relate to the properties of various fibers, including many different cottons, and to microscopy as a technique in fiber research. He is also the author of the chapter on fiber microscopy in the Fifth Edition of Mathew's "Textile Fibers", and several U. S. Department of Agriculture technical bulletins.

Mr. Bailey is a member of the Fiber Society, Sigma Xi, and AAAS.

In the study of textile materials—fibers, yarns, plies, cords, and fabrics—the microscope is a most valuable tool. With this instrument and accessory equipment it is possible to study dimensions, shape, color, structure and markings, other physical properties, and behavior toward chemical reagents, and to obtain a more exact understanding of the effects of any treatments applied. Control tests with the aid of the microscope, made during the development of a process, assist the investigator in modifying his method to attain a specific end.

At the Institute of Textile Technology, the microscope is being employed in the study of improvements in cotton products. Since individual fibers are often affected by treatments used to alter the characteristics of yarns or fabrics, it is necessary to consider the variability and the range of magnitude of the physical properties, including fineness, length, and shape, of the raw fibers. This information serves as a basis of comparison for the changes brought about by various treatments.

For certain investigations, fibers may be examined satisfactorily in longitudinal view to show effects of treatments—for instance, the lack of convolutions in mercerized fibers. However, examination in cross section will show in greater detail the effect of the treatment—the degree and uniformity of swelling, depth of penetration of additive materials, and the amount of fiber deformation.

A miniature microtome has been used for some years in the study of the cross-sectional features of wool, cotton, and other fibers. In this laboratory it has been used also for the sectioning of fabrics to show warp and filling yarns in their natural positions, to show the effects of various special finishing treatments on fabrics, and to permit the identification of the kinds of fibers in a fabric.

Dyeing and staining techniques may be used to good advantage in studying the penetration of additive materials such as preservatives for rotproofing, water-repellent coatings, and special finishes. Usually, such materials are transparent and not easily observed in thin sections unless they are colored. Selective dyes or stains may thus be used to show the location of the coating material. In the case of certain chemical treatments, the dye or stain is absorbed by the treated fibers; the untreated fibers are easily distinguishable since they remain unstained. Sized yarns may be examined for uniformity of coating of starch by the use of iodine solution. When cotton yarn which has been subjected to any acetylation treatment and dyed with an acetate dye, the fibers which have been more highly acetylated take on a dark coloration, whereas the fibers that were not so greatly affected by the process remained white. The incompleteness of the acetylation in this particular instance is readily revealed by microscopical examination.

The properties of fabrics (Fig. 1) and cords (Fig. 2) can be considerably altered by impregnation with chemical compounds. Rotproofing, mildewproofing, fireproofing, and

(Continued on Page 18)

The Southern Trend

The Clemson Man's Duty to the South

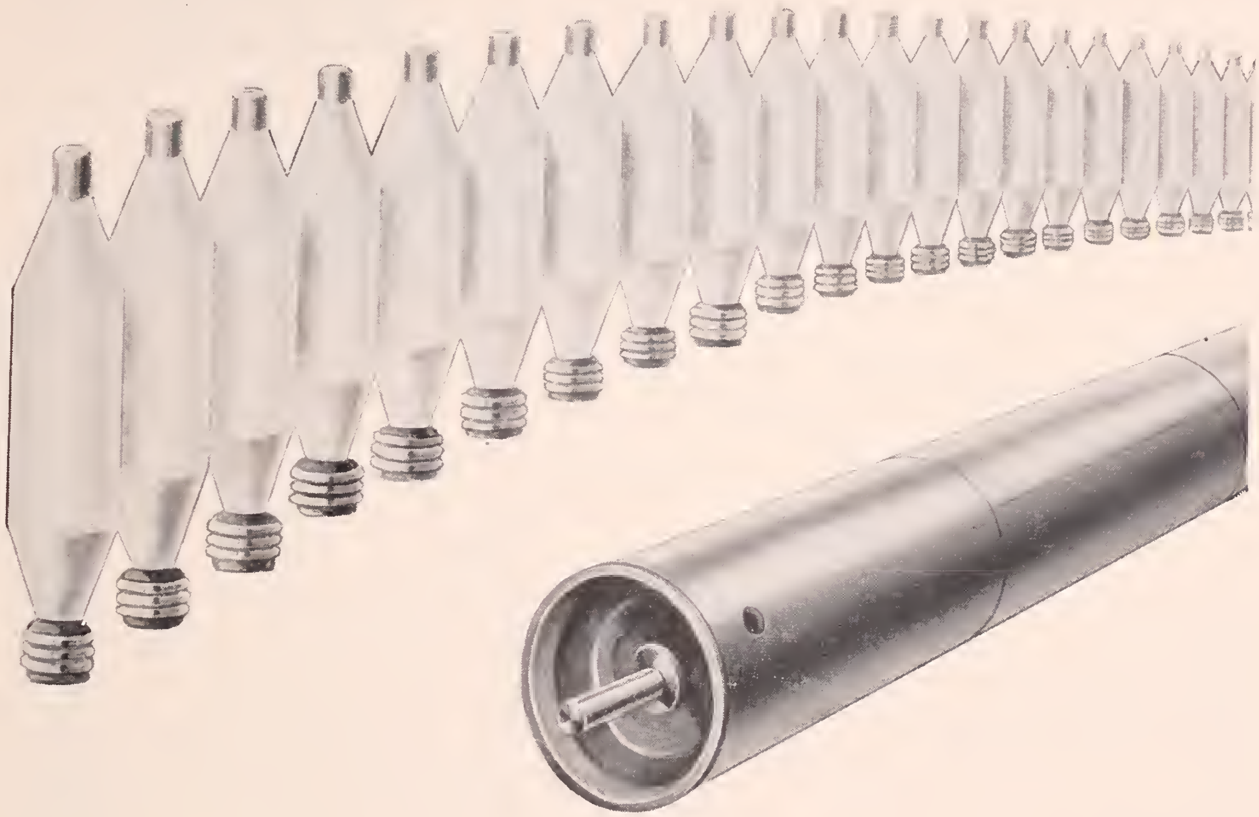
By George M. Moisson, Jr.

Hidebound, unchanging, and strife-torn New England has never found the solution to the old problem of excessive manufacturing costs. We, the new industrial South, have shown that new methods, new machines, and fair returns for our honest labors are welcome additions to our textile industry and that we are willing to learn, earn, and grow with our Yankee brothers who have turned to us for help.

We do not consider our expanding industry as wholly competitive with our Northern brothers, but look toward the shift as a beneficial spreading and decentralizing which would eventually occur in line with national security measures.

Farm to market transportation costs are lowered, high property taxes are avoided, labor problems are lessened, and population shifts are expected. Outside of the obvious economic advantages to be realized, the shift in population should do much to lessen the lingering animosities which have held over from the war of 1861. Having been born in the South and having heard tales of Carpetbaggers and Scalawags since early childhood, your author was prepared for the worst when duty called him North in 1936. After constant exposure to Yankees for ten years I have yet to be called a damn-rebel, or to be treated in other than a courteous way by any Yankee. I am convinced that any animosity which yet exists is entirely one-sided. It is our duty as Clemson men, and Americans, to work with, love, and respect the men who have nothing but respect for us.

The growth of the textile industry in South Carolina is reflected in the unprecedented enrollment in Clemson's textile school. New equipment is being installed every day, new faculty members with backgrounds of experience and knowledge are serving us well. We, as students of this great institution, have a fourfold responsibility to uphold when we emerge into the public view as "Clemson Men". The first is our duty as citizens to defend our country; many of us have done so, others are being trained well to serve as officers or technicians, if we are needed again. Our second responsibility is the privilege of the vote. We should analyze as best we can the situations facing our lawmakers, and support by means of the ballot the men of our choice. Our army and our democratic government provide us security and happiness. We face our third responsibility, that of securing and defending our families from the poverty and privations which they faced when we were children. Constant study and application, along with tact and sound business methods, should prevent the reoccurrence of "depressions" such as the last one. Fourth, but not the least of these, is our duty to ourselves, and to Clemson College, of upholding the principles instilled in us by our association with other Clemson men. Judicious display of knowledge and constant use of tact and diplomacy will assure success; arrogance and conceit will not command respect.



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WHY NOT?

By JOSEPH P. CLANCY

For the last few years, newspapers and magazines have been filled with dissertations on the movement of the textile industry to the South. A cartoon illustrating this would have New England weeping and gnashing their teeth and the South smilingly welcoming the newcomer with open arms.

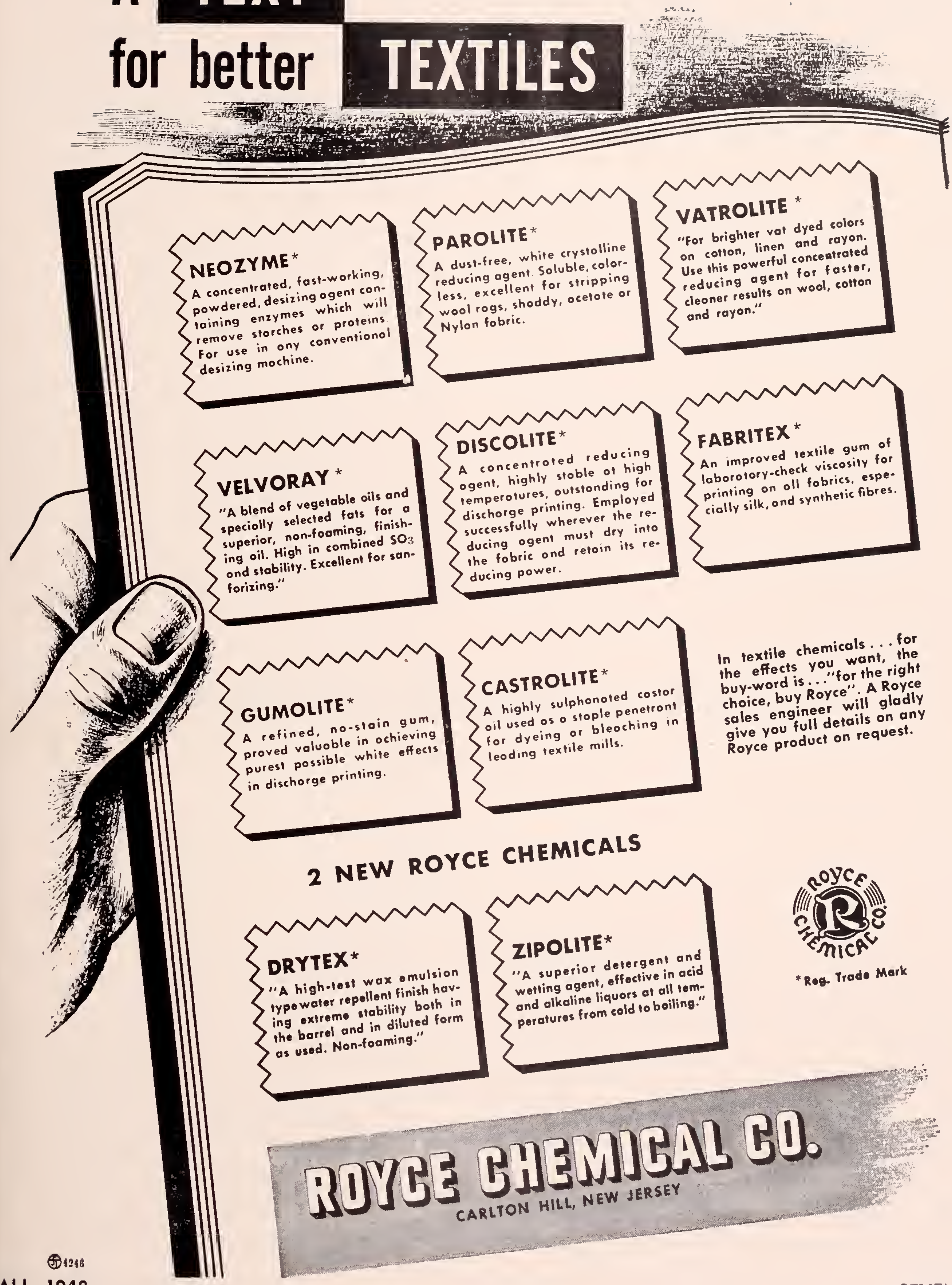
The first question that arises is whether or not this shift of industry is an entirely recent affair. To answer this question, let us go back before World War I. At that time in the South, there were a few small concerns, locally owned, producing grey goods. After 1918, the trend began. Not so much a national shift at first, but rather an expansion in the South itself. As time went on, finishing plants were set up and a few courageous individuals started converting the finished goods into consumer products. Through the '20's New England mills enjoyed fair prosperity while the southern companies grew quite slowly. During the depression of the '30's, many New England mills suffered severely. At the same time, the southern mills continued operation even though their output was slightly reduced. Prior to World War II, the shift to the South really began. This however was temporarily halted by our engagement in hostilities. The last shot of the war was also the signal for a continuation of the movement to the South by new textile industries. Today it is impossible to pick up a newspaper without noting the building of a new or the expansion of an old textile plant somewhere in the South.

Now we ask ourselves: what has caused this? The first answer that pops into some people's minds is that there is cheap labor in the South. This is a fallacy. True, wages per hank or per frame are lower in the South than in New England. Still, workers of equal capacity and ability receive approximately the same weekly wages. How can this be so? The answer is that manufacturers have found that the southern worker will give eight hours work for eight hours pay. This does not mean that any mill owner in the South expects his workers to sweat and slave from whistle to whistle. Fair rest allowances are granted. The worker has his job to do and if he performs it correctly, all concerned are satisfied. The worker has a good pay to take home and the manufacturer has quantitative return for his investment.

Then, if cheaper labor is not the true enticement for this remarkable growth, what is? Remarkable growth is really an understatement for since 1945 over one half billion dollars has been put into the textile industry in South Carolina alone. This amount of money would seem to indicate a permanent investment, thus demonstrating that the cotton manufacturers have finally obeyed the laws of economics. Have you ever heard of salmon being canned in Nevada or Oklahoma? Of course not! Canneries are set up in certain ports as close as possible to where the fish are caught. Economics demands this. Therefore, isn't it only natural that cotton should be processed where it is grown.

There is some question as to whether the center of manufacturing having moved from New England to the South might move on further south, say to South America. At the present time cotton is being successfully cultivated in Brazil. For all of that, it will be many years before a movement of this kind could be felt seriously. In 1794, Eli Whitney made New England the world's center of cotton processing by his invention of the cotton gin. It wasn't until the 1940's that the North's leadership was threatened. In other words, over 150 years passed before any section gave serious competition to New England in the cotton processing field. During this time, the technique and know-how of running a mill was learned by today's mill operators. At the same time, the worker's skill in handling new types of machines was increased. It stands to reason that a like period of time must elapse before a threat materializes to dislodge the South from its position of leadersrip.

Of course there are many other points which could be brought out concerning this movement, but let us consider just one more; that is housing. In the past, most mills had their own villages, many of which still exist today exactly as they were twenty years ago. However, some of the new leaders have looked into the future and are initiating a new method of housing. These men are now building their mills out in the country where surroundings are much more pleasant. These men are making it possible as far as they can to have the workers own their own homes. There is nothing crowded or industrial about their residences. Just a comfortable home that can be called their own and a small garden to bring in fresh produce. A man is happy in surroundings such as these, and what is more important to any executive than to have contented people at their daily toil.



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Dear Son . . . .

First printed in the "Textile Bulletin" July 15, 1947

One of the Southern textile industry's outstanding operating executives wrote the message which appears on this page. It is in the form of a letter to an imaginary son. Eds.

A short time ago you completed your college course and very soon will be going out into industry. It gives me pleasure to see you choose the same field that I did 35 years ago. The fact that you have chosen to go into the field of textiles demonstrates to me that you have faith in this industry, and also at least in your eyes I must appear successful. For a son to regard his dad as successful gives the father a feeling of pride that nothing else does. In fact it takes me back to the day when I helped you make your first kite. You regarded me as quite a craftsman then. Also, it reminds me of the days when I was teaching you to kick a football, and helped you land your first bass. Then you regarded me fully "All-American," and as a fisherman of the first rank.

Now you are going out on your own. Decisions from here on are going to be yours. Of course, there will always be more experienced and wiser men to whom you may go for advice and counsel, but in the end you have to make your own decisions. Once the decision is made you must see it through with patience and unrelenting effort on your part. It will not always be easy to stand with your decisions. Often it will take courage and you may find yourself standing alone. At other times you will find that you have decided unwisely. In that case remember, the only disgrace is to hold stubbornly to a course that you know is wrong. It is not the prerogative of women alone to change their minds, but men of wisdom often do so. As you climb the ladder of success, you will be more and more dependent on the help of others. May I give you something that has long been a guide for me? A guide so firmly fixed in my mind that it has become almost a prayer—in fact I call it "The Executive's Prayer:" God make me aggressive enough to face any situation and at the same time humble enough to realize the value of advice and counsel from my associates.

Remember, son, you alone cannot accomplish much in the short span of a lifetime, but with the help and cooperation of others, you and they can be a powerful force that can accomplish much. As a member of the football team you learned the value of team play. The same is true in a textile plant. The president of the company, along with his board of directors, sets the policy and fixes the schedule. The manager, or perhaps the superintendent, calls the plays just as you did as a quarterback. From now on your opposition will not be just an 11-man squad, but will be a more tricky adversary made up of a line recruited from the State of Competition, with Cost and Efficiency at the ends; in the backfield are Waste, Safety, Quality and Maintenance; the referee is Public Opinion. It takes a smart strategy board, and quarterbacking of no mean ability, to compete with that kind of opposition. Yes, son, and an awful lot of downfield blocking—an awful lot. In this game there are no time out or rest periods. It is a game played for keeps.

It will be a good many years and there will be many hard jolts before you are qualified to call the signals. As a matter of fact, for the first year or two you will be lucky to be much more than the water boy. Keep in mind that the company you have chosen to work with has an experienced team. It has been successful for many years. It is made up of men of ability and experience. Watch and learn from those men. You will find them helpful and considerate, and when the day finally comes for you to call the signals, be sure you have learned well from those more experiencd men the plays and the trickiness of the opponents.

Son, if you feel that your education is complete when you are awarded your degree, you are greatly mistaken. You will then be prepared only to begin learning. From now on your textbooks will not be made up of printed pages, but of people, machines, customs, methods, and human emotions. Only the machines will be blue printed —the rest, only contact with them, from day to day, will give you insight and understanding. As you grow older your sense of values will change, block letters and honorary fraternity keys will no longer be important. From here on out your value is going to be judged by your knowledge of the problem at hand, and your ability to do something about it. As a child you used to like to play Follow-the-Leader. Now you are going to play that same game, except that it will be sometime before it comes your turn to be the leader! Be sure when your turn comes that you have learned well how to lead, and remember, to be a leader you must have followers. Remember this. No amount of title will give you the necessary experience that will win the confidence of the workers.

Your immediate problem is to gain the necessary knowledge and experience to become a foreman. Only Time and Doing will give you these. Today's industry is no place for mental softies. Neither is it a place for yesterday's loud, physical giants or domineering, self-assertive personalities. Instead, today's foremen must be men that can and will create good-will and inspire loyalty within the ranks of the workmen. To perform well the duties of a foreman, you will have to acquire the knowledge of the capacity of machines, and how to keep them running. You must have the ability and knowledge which will enable you to instruct men how to use these machines. You must know how to keep track and stay within the boundaries of your departmental cost, and you must understand the capacity and temperament of the men whom you lead.

Son, you are finishing school at a very inopportune time. Unfortunately you have not learned how to ask for a job. You and your fellow students have not had to ask; as it is you who have been asked for, almost begged for by industry. I am afraid this situation has given you and your fellow students a false sense of importance. The salary you are going to be paid is all out of proportion to your knowledge and ability. Take it from me, son, the industry is not holding its breath or simply marking time until June for you boys to solve their problems. I would much rather you were coming into the industry as it was in 1930 or 1939; then you would have known just what having a job meant. In those days you would have been pushed by others to show your ability, and unless you made an effort to get and hold a job, you would have been one of those that fell along the wayside. You were most too young to notice or remember then, and besides you have no choice in the matter, but don't be misled or blinded by your own importance based on a temporary condition.

The industry that you have chosen to enter is an old one, in fact I claim it is the oldest. When Eve, in the Garden of Eden, hid her nakedness with an arrangement of fig leaves an industry was born. As long as we have extreme weather, and as long as society refuses to accept nudism we will continue to have a textile industry, whether the fibers used are natural or synthetic. In the year of 1857 in New York, a Mr. Demering paid this glowing tribute to cotton:

"Great and incalculable is the wondrous power of cotton! It earns the poor man's bread and fills the rich man's pocket. It covers a new-born infancy and forms our garments for the grave. We toil for it by day, and lay ourselves down by night, while it refreshes and wärms our hearts to the opening prayer of morning. The hopes and fears of millions, born and unborn, cluster around those unsightly cotton bales. It permeates through every department of civilized, and it may be, uncivilized life. It invents cotton gins and spinning jennies, and lifts inventive genius to immortality. It quickens slow moving industry and sharpens hungry avarice. It enlarges the boundaries of science and adorns art. It fills the imagination of poets and divines, and constructs cunning platforms for statesmen and politicians. It institutes oligarchies and perpetuates them, while it binds up with its tough fiber the democratic heart, and shields it from destruction. It freights the ships of commerce, and sends a missionary to every clime, and in the hour of danger barricades our cities, and nobly protects us from pillage and booty. Wonderful! most wonderful! is the power of cotton! the universe is but a cotton mill, elaborating the necessities of men."

In 1857 they did not have today's synthetics, but even more so today the textile industry is an industry that is making for "better living." Keep in mind this, that all useful work is directed toward the development of physical or cultural and spiritual welfare of mankind. In the final analysis this is the only reason for work and effort, and unless work and effort are so directed towards that end it is useless.

Finally, son, don't take yourself too seriously. Any individual is very small in comparison to this old world. When you begin to feel how important you are, and how mighty your decisions, you are headed for a cruel fall. Better drive to the mountains and feel their majestic silence and observe how little time or man has changed them, or go to the seashore and observe how inevitable is the tide in spite of all the efforts of man. You must develop a spirit of tolerance. Remember, "The responsibility of tolerance rests with the one with the greater power of knowledge and understanding." Also, son, remember "those that pass you on your way up are the same people you will meet on your way down."

In conclusion, I can give you no better code than these words taken from the Book of Micah, "He hath shewed thee, O man, what is good: and what the Lord doth require of thee, but to do justly, and to love mercy and to walk humbly with thy God."

Lovingly,
Dad.

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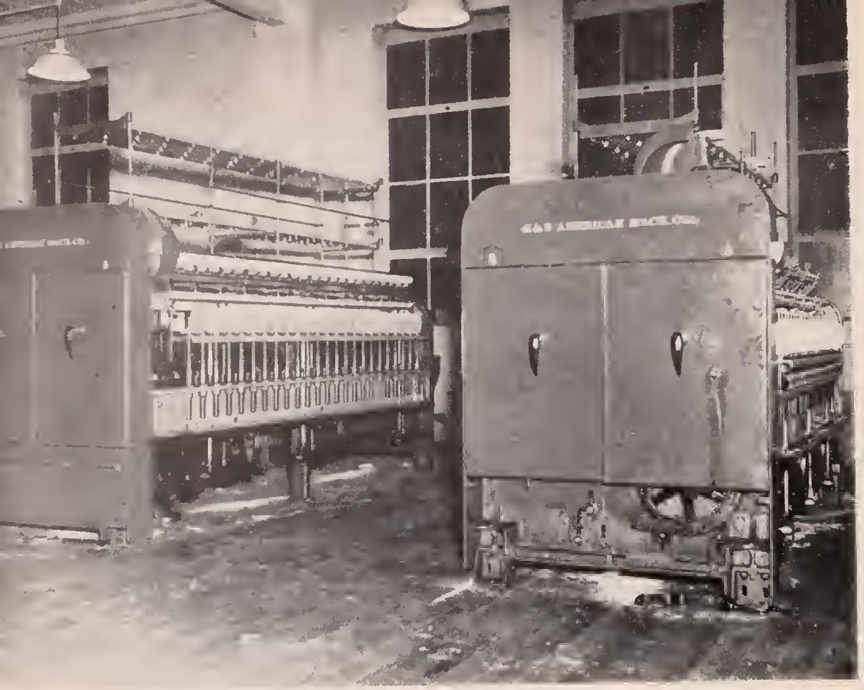


Every year during "Homecoming" week-end at Clemson there are hundreds of people who visit the Textile School. Almost every one of these visitors has a slightly different reason for walking through the school and the interest of each varies accordingly. There are some who simply 'follow the crowd,' some who go along with friends and relatives who have interests in textiles; in quite a few cases we find those who have never seen any kind of textile machinery before, a large number are former graduates returning to the old stamping-ground and among these and added to these are the many textile executives and operating executives who have a first hand interest in the school equipment and activities. Whatever their reason for coming might be, these visitors are always welcome at the Clemson School of Textiles.

This year, the visitors found a great change in the equipment around the Textile School. The people who were visiting Clemson for the first time expected to find the Textile School as well or better equipped with modern machinery as the average textile plant, and this group was not disappointed. Those who entered the Textile Building expecting to be bored stiff by viewing the same old stuff that they have seen for the past several years were pleasantly surprised.

In fact and in theory the Clemson School of Textiles is now one of the most modern textile schools in the United States. Within the past few months, over $125,000 worth of new machinery has been installed and is now in operation for teaching and experimental purposes. Adding to this the thousands of dollars worth of so called 'old' equipment, which is still as up-to-date as much of the machinery still in production in various textile plants and extremely useful for school purposes, your reporter can find no evidence to show that any other textile school in the South is so well equipped.

Such a concentration of modern and valuable equipment and machines did not 'mush-room' into existence over night, however. Its accumulation required work, effort, and money from so many different persons who are interested in Clemson's welfare that it would be impossible to give full credit to all to whom credit is due. To mention a few who are responsible, there would be the President of Clemson College, the Board of Trustees, the Dean and faculty of the School of Textiles, various textile concerns and associations and our representatives in the State Legislature at Columbia.

When the machinery from the present Physics Building was moved into the newly completed Textile Building in 1938, a need for more and newer equipment was seen immediately and movements were started to provide this equipment. Various textile companies donated some machines, as they have continued to do all along and it is highly appreciated, but this was hardly a drop-in-the-bucket compared to what was needed.

The South Carolina Cotton Manufacturers Association put its shoulder to the wheel and voted to assess its members at a rate of 1 per cent for each spindle owned by that member and thereby build up a sizeable fund. But the war came along about this time and, as we all know, new machinery could not be bought for love or money until recently, when the machine companies have begun to catch-up on their back-log of orders.

Now, although some orders still require several months to be filled, the Textile School has been able to buy much of the equipment it needs, and the large, empty halls which greeted the returning veteran students and visitors for the past few years are fast being partitioned off into smaller, well-equipped laboratories.

The need for modernizing the Textile School has long been recognized by those intrusted with its operation, but, as has already been mentioned, there were many obstacles to overcome—the war lending to the major part. Such an improvement as we now can show is in itself valuable in many respects. The primary purpose for the school is, of course, training men for the operation of textile plants. With this new equipment, the textile student will be getting training on exactly the same type of work as he can expect to supervise after graduation. This accelerates his interest and willingness to learn, resulting in a better teaching job with much less effort from all concerned.

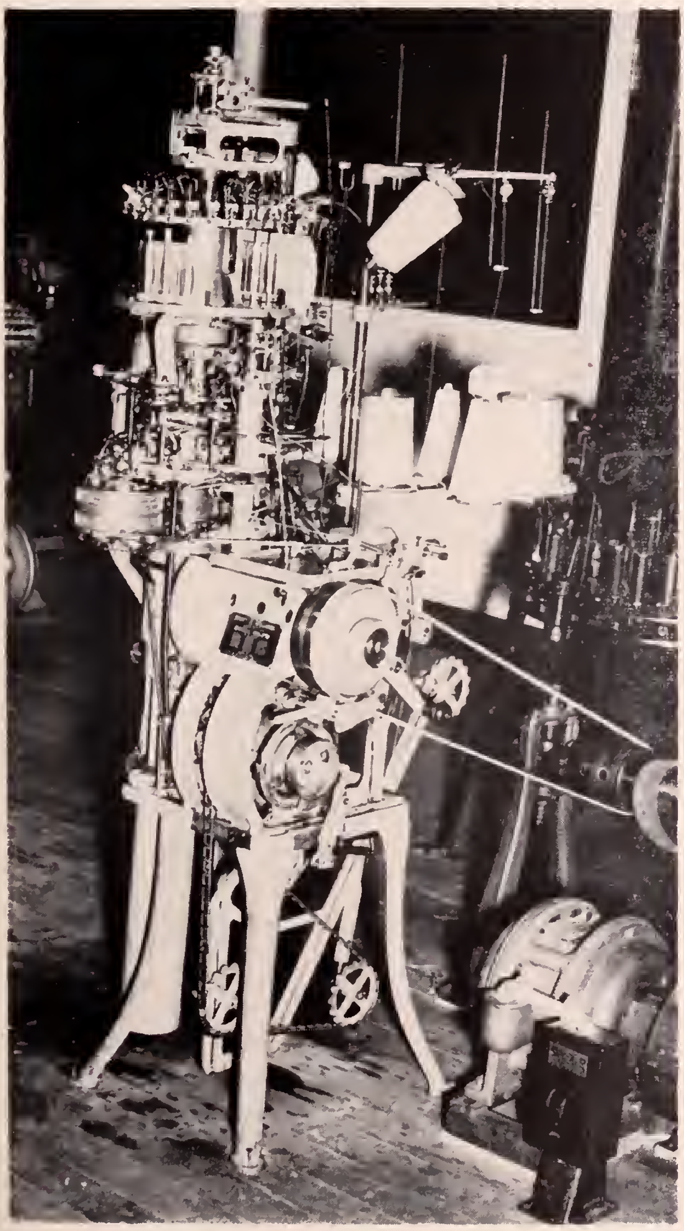
By having equipment equivalent to that of a modern textile plant, various and useful experiments can be carried on at the Clemson School of Textiles, and everyone, including the textile industries, will reap tremendous benefits from facts and figures taken from the results.

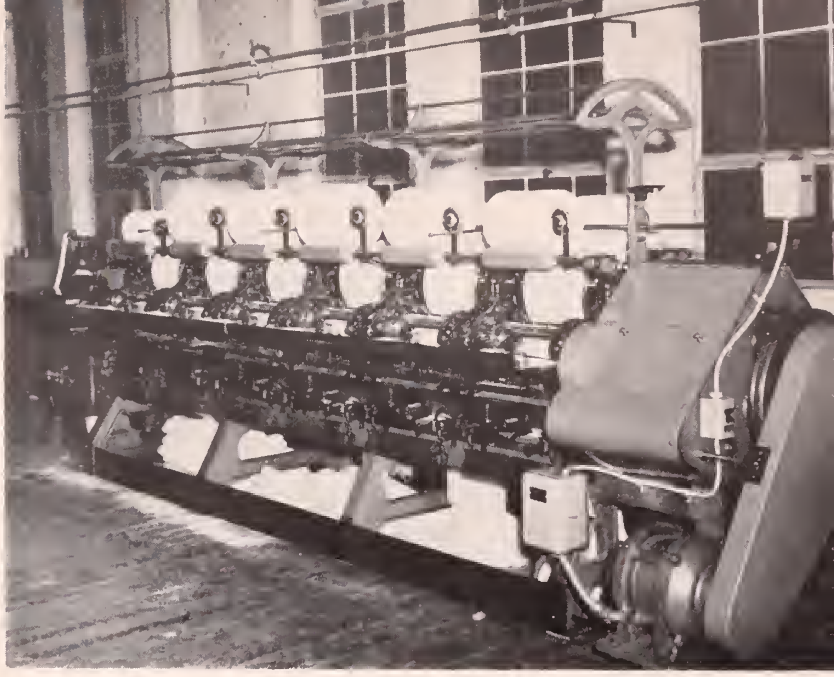
Also, there are notable morale effects to be gotten from having the knowledge that here at Clemson, in South Carolina, we have one of the largest and best equipped textile schools in the nation. Students, and others concerned with the School of Textiles, will take pride in being connected with the school and showing visitors around the building. Added to that is the old established feeling that success breeds on success. As the people who have the power and money, such as our Board of Trustees, the State Legislature and the Textile Industries notice what a splendid

Displayed

project the School of Textiles at Clemson College has turned out to be their interest and efforts are bound to accelerate and so will the progress of the Textile School.

As a method of discussing the new machinery in the School of Textiles, let's go back and take a trip with the





"Homecoming" visitors. Of course the older machines are still around and were inspected during the same tour of the Textile Building.

Beginning with the opening machinery and proceeding along the logical order in which the material passes while being converted from raw stock into cloth, we have a complete Saco-Lowell opening and picking process, consisting of blending feeders, vertical openers, a number 12 opener, all necessary condensers and filters and a one-process picker. The opening equipment is connected with the picker by a conveyer pipe equipped with sufficient wind gates to run stock through any combination of machines desired. The opening and picking has electro controls throughout. throughout.

From the picker we proceed to the card room where we find a new Saco-Lowell, roller-top card; a Saco-Lowell lap machine used in conjunction with a Saco-Lowell controlled draft drawing frame; a Saco-Lowell J-3, a Whiten Inter-Draft and an H & B Super-Draft fly frame.

Right next door is the new combing equipment consisting of a Saco-Lowell, 4 Delivery Drawing Frame feeding 8 ends and drafting 9-12. This drawing prepares the sliver for a Saco-Lowell Lap Winder which boasts all the latest safety devices and in turn furnishes laps for a Saco-Lowell double-sided long-piecing comber.

In the spinning department the newly installed machinery consists of a Saco-Lowell coarse yarn spinning frame with

(Continued on Page 16)

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GREENVILLE, SOUTH CAROLINA

News Around the School of Textiles

By R. J. RICE

LARGE ENROLLMENT IN TEXTILES

According to reports from the Registrar's Office, 821 students registered for the School of Textiles this semester. This is an increase of 111 over last semester's enrollment and is the largest enrollment on record. Based on the total number who registered at Clemson this semester, 25 percent of all former students and 28 percent of all new students registered for one another of the courses of study offered by the School of Textiles.

FALL MEETING OF SOUTHERN TEXTILE ASSOCIATION GREAT SUCCESS

After overcoming a late start because of the rain, the fall meeting of the South Carolina Division of the Southern Textile Association held in the Textile Building Saturday, November 6, developed into the most successful ever held. The rain seemed to have little, if any, effect on the attendance. Over 250 operating executives of textile mills of South Carolina showed up for the meeting, and the wet atmosphere outside only served as an opening topic of conversation as they arrived, and to give a more friendly, consolidated and attentive feeling among the members as the meeting got under way.

Helping to give the gathering an air of familiarity were the guides furnished by Phi Psi; the brightly decorated booth of Bobbin & Baker, where the attending members could register and buy football and luncheon tickets; the advertising companies who gave away souvenirs at the door and the flashing of light bulbs from the camera of Mr. Manuel J. Rogers, State Editor of the Greenville News, who came down to cover the convention.

Reverend E. W. Hardin, pastor of the Clemson Methodist Church, gave the invocation and the textile men were welcomed by Dr. R. F. Poole, president of Clemson, and Dr. Hugh M. Brown, dean of the School of Textiles.

Two talks, one dealing with personnel and the other with machinery, were given. Speakers were Mr. L. M. Howell of Howell-Wilson associates, of Greenville, who talked about "Causes and Cures of Bobbin Rejects at the Spooler," and Mr. W. M. Mussman, personnel manager of the Riegel Textile Corporation at Ware Shoals, who discussed "Supervisory Training."

About the waste caused by spooler rejects (tailings), Mr. Howell highlighted his talk by saying, "If any of us had all the money lost by cotton mills in South Carolina alone as a result of cutting salvageable yarn from bobbins for a six-month period, we could come pretty close to retiring. We admit that the salvage of yarn at the tailing machine is a tedious procedure, but at the present day price of cotton, together with high manufacturing costs, everything possible should be done, first, to put the yarn on the bobbin in such a manner that it will spool off and, second, to try to salvage all yarn possible from bobbins that are tangled."

Mr. Mussman stressed the importance of organized training supervisory personnel of textile plants and recommended that "We give more attention to defining each supervisor's authority as much as we can."

He stated to the effect that ". . . with the demand of modern management and modern industry for greater efficiency, American industry is rapidly learning that it can better handle its personnel problems (and supervisory training is one of them) by the same careful study that it gives to production problems."

At a short session allotted to business, Mr. D. O. Freeman of Startex Mills at Tucapau was elected chairman of the weaving section and Mr. D. H. Roberts of Spartan Mills was re-elected secretary of the South Carolina Division.

Mr. J. B. Lybrand of Mills Mill in Greenville, Chairman, presided over the meeting.

Mr. John T. Wigington, Director of the Cotton Textile Institute at Clemson, was in charge of the program and had arranged for serving a dutch luncheon right in the Textile Building at 12:30.

During lunch, the much hoped for sun began to shine outside and the Textile men "adjourned" to Memorial Stadium for the Clemson-Furman football clash.

LARGE PERCENTAGE OF TEXTILE GRADUATES REMAIN IN STATE

During the 15th Southern Textile Exposition held in Greenville last month a survey was made of the Clemson men attending, for the purpose of making new data cards on former graduates. From the information thus obtained, a sheet has been prepared showing the graduates' names, addresses, places of employment, and positions held, and dividing them into classes of graduation. This list makes interesting study for anyone who is connected with the Textile School.

The number who attended the show according to class were: 1903-1, 1906-1, 1909-1, 1913-2, 1914-1, 1915-2, 1916-2, 1919-1, 1922-2, 1923-5, 1924-3, 1925-3, 1926-2, 1927-3, 1928-6, 1929-3, 1930-1, 1931-4, 1932-4, 1933-2, 1934-1, 1935-2, 1936-5, 1937-7, 1938-9, 1939-10, 1940-10, 1941-9, 1942-15, 1943-13, 1944-9, 1945-2, 1946-3, 1947-22, and 1948-36.

Of the 205 Clemson graduates who attended the exposition, 140 are employed in South Carolina, 26 in Georgia, 23 in North Carolina, 4 in Virginia, 3 in Alabama, 3 in New York, 2 in Tennessee, 2 in Louisiana and 2 in Pennsylvania. The position of employment of these men ranged from apprentices in training programs to president and treasurer.

FIBER GROUP TO BE HERE AGAIN

In a recent decision to hold a meeting at Clemson for the second time, the members of the Fiber Society gave as their strongest reason the simple fact that they received such splendid treatment here in 1944 that they wanted to return for more. As most Southerners take great pride in being praised for their hospitality—the Fiber Society members spared no effort in expressing their praise—and due to the fact that the Fiber Society has never before returned to a place for a second time, it seems as if the people of Clemson should feel proud of this open honor and want to know more about the Society before it returns to Clemson for its second visit. People who appreciate us are the ones we like to see again.

In December of 1941 a small group of scientific men interested in the physical and chemical properties, the origin and technological applications of fibrous materials, met in Atlanta, Georgia, for the purpose of exchanging ideas and scientific information. From this meeting the present Fiber Society grew with the objective of the advancement of scientific knowledge pertaining to fibers, fiber products and fibrous materials.

Due to travel conditions the group did not meet in 1942 but held the second meeting in Charlotte, N. C., on September 17-18. Since the meeting in Charlotte the Society has held bi-annual meetings with Clemson College as host in 1944 and Callaway Institute as host in the fall of the same year. In 1945 the group met at North Carolina State College. Philadelphia Textile Institute was host in the spring of 1946 and the Institute of Textile Technology in the fall. In 1947 the Society met at the Southern Regional Research Laboratory in New Orleans, Louisiana, and the fall meeting was held at Princeton University. The University of Tennessee was host to the group at Fontana Village, North Carolina, in the spring of 1948 and the group met at Massachusetts Institute of Technology in the fall of this year.

The purpose of the Society is perhaps best illustrated by quoting directly from the Constitution, Article I, Section II, as follows:

"The Society is conceived on the hypothesis that the benefits of scientific knowledge gained through research on fibrous materials accure to industry best, and this knowledge develops and matures most soundly only when there can be a meeting of minds, resulting in a free exchange of ideas and scientific facts. This Society is hereby established to provide the necessary means to this end, to encourage the informal presentation of papers on work both completed and in progress, and to stimulate helpful discussions on a high scientific level."

It is further required by the by-laws that no quotation or statement of opinion made during the discussions be permitted to go to press unless submitted by the speaker himself. The by-laws also provide that the membership shall be limited if such action is necessary.

Dr. K. L. Hertel of the University of Tennessee is president of the Society for the 1948-49 period. Mr. R. T. Kropf of Belding Heminway Cor-Ticelli is vice-president, Mr. John T. Wigington of the Cotton-Textile Institute is secretary, and Mr. S. Jack Davis of Callaway Mills Company is treasurer.

It is significant that Clemson has again been chosen as the meeting place for the Society. All the gentlemen present at the meeting in 1944 enjoyed themselves so much and expressed such praise for the hospitality of the Clemson people until the Society decided to meet at Clemson again in 1949. Dr. Hugh M. Brown, Dean of the Clemson Textile School, is chairman of the Program Committee, and is working at present on a very interesting program for the spring meeting.

CLEMSON MEN KEEP INFORMED

Those who are responsible for the standing of Clemson's School of Textiles are constantly alert and striving to acquaint themselves with the more modern methods and practices of the Textile Industry, plus new scientific information. The effort put forth for such objectives is evident by the following events which have taken place since the last issue of the Bobbin and Beaker was published.

Dr. Hugh Monroe Brown, Dean of the School of Textiles and Dr. Antonius Nicholas Johannes Heyn, Professor of Natural and Synthetic ibers, attended the fall meeting of the Fiber Society at the Massachusetts Institute of Technology, Boston, Massachusetts. This meeting was attended by several other well-known Clemson men; among these was Mr. John T. Wigington of the Cotton-Textile Institute at Clemson. Mr. Wigington is Secretary of the Fiber Society.

The part played by Clemson was not all "take." Dr. Heyn made Clemson's contribution to the very educational program by preparing and presenting to the Technical Ses-

(Continued on Page 20)

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PHI PSI

Because of increasing scholastic progress among textile students, Iota Chapter of Phi Psi has been forced to raise the requirements for eligibility. This step was necessary in order to comply with the national constitution of the fraternity which obligates each chapter to maintain the highest possible standards.

These new minimum grade point ratios have been set at 6.00 for first semester juniors, 5.50 for second semester juniors, and 4.75 for seniors of either semester.

Harry M. Miller, a member of Phi Psi has recently received the honor of being selected as a member of Who's Who Among Students in American Colleges and Universities.

On November 18, 1948, thirty-six students were initiated into Phi Psi. This was the largest number ever to enter Iota Chapter. The new members are A. E. Abrams, Ware Shoals, S. C.; J. R. Anderson, Elmhurst, Illinois; M. H. Anderson, Greenville; Ashley, W. E., Donalds; P. E. Baker, Central; R. F. Barrett, Greenwood; E. Bates, Clemson; J. B. Black, Honea Path;; H. E. Bright, Greenville; J. G. Brock, Whitmire; H. E. Brockman, Charlotte, N. C.; J. A. Byrd, Greenville; F. B. Cameron, Greenville; E. J. Corley, Ninety Six; L. P. Corley, Clemson; D. E. Cowan, Abbeville; F. M. Cureton, Union; A. F. Garrison, Hartwell, Ga.; R. C. Hoffman. Clemson; T. L. Howle, Clemson; F. M. League, Easley; J. L. Lucas, Lancaster; D. C. McIntyre, Marion; P. C. Mickle, Easley; U. B. Moore, Clemson; V. C. Oxner, Kinards; C. L. Pickens, Anderson; R. J. Rice, Anderson; W. L. Rutledge, Greenville; D. K. Seaborn, Walhalla; E. W. Seigler, Greenwood; J. L. Strotman, Orangeburg; H. D. Stroud, Richmond; H. E. Thompson, Honea Path; J. L. Vinson, Union.

After the Clemson-Duquesne football game a drop-in was held by Iota Chapter in the Phi Psi Room for alumni, members, and their families and friends. Refreshments were served and close to one hundred people were present.

12 years before the signing of the Declaration of Independence of the United States, of America, the Geigy organization came into existence.

Thus, 1949 finds the Geigy organization one hundred and eighty-five years old.

With that in mind and the fact the organization has shown a conservative and steady growth, it is only reasonable to deduct that Geigy occupies a distinct position in the field of dyestuffs and auxiliary products.

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American Association of Textile

After a summer of inactivity, the Clemson chapter of the A. A. T. C. C. held its first formal meeting on September 28 and elected officers for the coming year. Doug Seaborn of Walhalla was elected chairman; Avery Garrison of Hartwell, Ga., vice-chairman; Joe Clancy of Lancaster and Lynn, Mass. secretary; and Jerome Wilson of Anderson, treasurer. Old members active at the start of the school year were: Armstrong, L. W., Barrett, C. M., Bloxham, A. W., Clancy, J. P., Dyer, C. A., Ellison, R. C., Fooshe, W. K., Garrison, A. F., Heaton, J. L., Kelsey, W. B., Moisson, G. M., Powers, B. L., Riser, C. W., Seaborn, D. K., Spearman, J. E., Westmoreland, R. N., Wilson, J., and Withington, J. M.

On October 14 a fish fry was held at the Y Cabin at which time new members were initiated into our local chapter. The food committee was composed of Messrs. Wilson, Riser, and Clancy with Mr. Seaborn as head chef and a fine time was had by all. The following are the new members: Boggs, R H., Emerson, J. H., Hatfield, H. B., Keasler, B. M., Keasler, W. H., Mathias, W. L., McGuire, H. N., Neal, J. L., Reynolds, H. M., Rutledge, W T., Taylor, W. F., Thompson, G. N., and Thornton, E. C.

During the coming year it is planned that movies pertaining to the textile chemistry industry will be procured for the benefit of the group. Also the chapter intends to have leaders in the field come to Clemson to talk to the group.

J. P. Clancy

———BOBBIN AND BEAKER———

E. Hays Reynolds, Class of 1947, is now employed as Sales-Service Representative with Keever Starch Company in Greenville, S. C.

———BOBBIN AND BEAKER———

A new teen-age fad now sweeping the country is a product of Riegel Textile Corporation. It is a knit cotton jersey glove in brilliant colors sold in mixed or matched pairs. Peggy Ann Garner, young motion picture actress, is the designer and has named the gloves, in typical teen-age fashion, HEP-MITS.

———BOBBIN AND BEAKER———

Who's Who?

A train is operated by three men. Smith, Robinson, and Jones. They are fireman, engineer, and brakeman, but not respectively. On the train are three business men of the same names, Mr. Smith, Mr. Jones, and Mr. Robinson. Each of the following statements is important.

1. Mr. Robinson lives in Detroit.
2. The brakeman lives half way between Chicago and Detroit.
3. Mr. Jones earns exactly $2.000 a year.
4. Smith beat the fireman at billiards.
5. The brakeman's nearest neighbor, one of the passengers, earns three times as much as the brakeman who earns $1,000 a year.
6. The passenger, whose name is the same as the brakeman, lives in Chicago. Who is the engineer?

New Profs

L. H. Jameson

Professor L. H. Jameson, Clemson graduate Class of 1942, has returned to Clemson to instruct in the Weaving and Designing Department of the Textile School. He received a B. S. degree in Weaving and Designing and did graduate work at Furman University and Clemson. Upon graduation Professor Jameson was called into the Army Air Force. He served as a pilot for three and a half years with eighteen months of overseas duty. After being discharged he worked in the Weaving Department and Laboratory of Dunean Mills. He later worked in the Standards Department of Abbeville Mills.

———BOBBIN AND BEAKER———

John C. Edwards

Professor Edwards graduated from Clemson in 1942 in Textile Engineering. He was a technologist with the Q. M. Corps in the Engineering Depot at Jefferson from 1942 to 1945. Next he worked in the R & D Laboratories at the Philadelphia Q. M. Depot for three years. During this time he was working on the development of textile items used by the U. S. Army. Professor Edwards is now an Assistant Professor of Textiles at Clemson.

———BOBBIN AND BEAKER———

W. T. Rainey, Jr.

Professor Rainey received his B. S. in Chemistry from Davidson College in 1939 and the two years following did graduate work in Chemistry at the University of North Carolina. He then returned to Davidson for a year as Professor of Organic Chemistry. From Davidson he went to Washington, D. C., as a Research Chemist in the Chemi-

(Continued on Page 16)

New Equipment Displayed

(Continued from Page 11)

Saco-Lowell Roth draft on one side and Saco-Lowell Z draft on the other; a medium yarn Saco-Lowell spinning frame with Saco-Lowell Shaw and Z drafting systems are especially designed for synthetic fibers ranging up to 3 inches in length. Each side of the two Saco-Lowell frames is geared for independent twist. This gives great flexibility and is especially useful for teaching purposes. Such a set-up provides for a maximum variety along with a minimum investment for machinery. These Saco-Lowell frames are equipped with New-Era ball bearing spindles and Vari-Pitch Wide range variable speed drives.

There are one course yarn and one fine yarn H & B spinning frames, both equipped with the Casa-Blanca drafting system on one side and the H & B 4-roll system on the other. On the 4-roll system the middle roll can be run unweighted when running long-staple fibers. These H & B frames are also being equipped with variable speed drivers.

Leaving the spinning, we next go to the warp and filling preparation department. Here we find a new Cocker high speed warper. This warper is especially designed for continuous filament yarns, such as rayon, but can be used on cotton with excellent results. It was recently installed, along with a new Cocker rayon slasher, with the intention that the combination would not only give the students training on a modern warping and slashing system and be used to make all the warps needed by the school, but could also be used by textile companies for experimental purposes.

For winding filling, there is a new, 20 spindle, Universal No. 90 filling winder, suitable for both natural and synthetic fibers.

The weaving section is also well-equipped with modern machinery. There are 4 new X2-Draper looms for use on cotton and spun rayon; 1 XD-Draper loom for continuous filament fibers; 1 XP Draper loom for spun rayon weaving and 3 S6-Crompton-Knowles looms especially designed for continuous filament yarns, such as rayon or nylon.

In the Knitting Department we have a Cidego warp knitting machine, a Aveco Tricot flat knitting machine, a brand new Scott and Williams Half-Hose Pannel-Warp Circular Knitting machine equipped with a rubber lay-in attachment to make men's fancy hose and in addition to these we are expecting, in the near future, to install a machine for men's English-rib hose, one to make children's anklets and a machine to produce women's 51 gauge nylon hose.

In the air-conditioned laboratory used for textile testing purposes we have a Tubor Abrasor, a Suter-Webb Length Sorter, an Inclined Plane Tensile Tester, a Serigraph yarn evenness tester and several Scott, pendulum type testers.

(If a visitor is especially interested in textile testing machines, he can stop by the laboratories of the Cotton Textile Institute, located in the Textile Building, where they have such machines as the Micronaire, for determining the fineness of the cotton fiber, and the Fibrograph for determining the length, length distribution and uniformity of the cotton fiber.)

A walk through the Chemistry and Dyeing laboratories will show them to be very well equipped—even without any recently added equipment. And in the Cost and Time Study section, where the technical-knowledge accumulated by the textile student as he passes through the various classes or processes and machines already mentioned, is brought together as a single unit and summarized, you will find a good supply of such equipment as stop watches and calculating machines.

In addition to the new equipment in each individual department, the laboratories of the Textile Building have been equipped with the latest type humidifying system. This enables actual mill air conditions to be duplicated in any or all of the laboratories and thus to be able to obtain true and valuable results from projects and experiments carried on in the Clemson School of Textiles.

——BOBBIN AND BEAKER——

New Profs

(Continued from Page 15)

cal Warfare Section of the U. S. Naval Research Laboratory. From 1944 to 1946 he served in the U. S. N. R. as an instructor in the Radio Technicians School on Treasure Island near San Francisco, California. After leaving the Navy he returned to the University of North Carolina where he received his Ph. D. in Chemistry.

——BOBBIN AND BEAKER——

Humphrey K. Ezell, Jr.

Professor Ezell was born in New Orleans, Louisiana, but attended grade schools in South Carolina. He graduated from Pendleton High School and from there went to Furman University where he received his B. S. degree in 1948. While at Furman he was President of the Student Council and a charter member of Blue Key. He served as an instructor of Chemistry at Furman from January to June of 1948 and stayed on to work under John R. Sampey in the U. S. Naval Chemical Research Program during the summer, coming to Clemson in September.

——BOBBIN AND BEAKER——

Richard Calvin Hendrix

Professor Hendrix finished in Textiles from Parker High School in Greenville in 1942. He came to Clemson for one year, leaving to serve in the Naval Air Force for 26 months. He returned to Clemson and graduated in Textile Engineering in August 1948. Professor Hendrix is now an Instructor of Carding and Spinning. While a student he was a member of Phi Psi and Phi Kappa Phi.

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Textiles Through the Microscope

(Continued from Page 3)

moistureproofing of fabrics have important connection with the usefulness of the fabric. They are essential for tents, sandbags, airplane covers, and canopies. Microscopic examination of sections of treated fabrics for degree of impregnation, and for comparison of various experimental impregnations in regard to depth and uniformity of penetration, is of value in the interpretation of specific chemical processes.

With the use of the microscope and special techniques, a detailed comparison of different types of cord can be made, and the effects brought about by different treatments can be accurately observed.

Cross sections reveal the changes resulting from physical and chemical treatments during the manufacturing processes, such as wet-stretching, emulsion coatings, twist combinations, and other treatments.

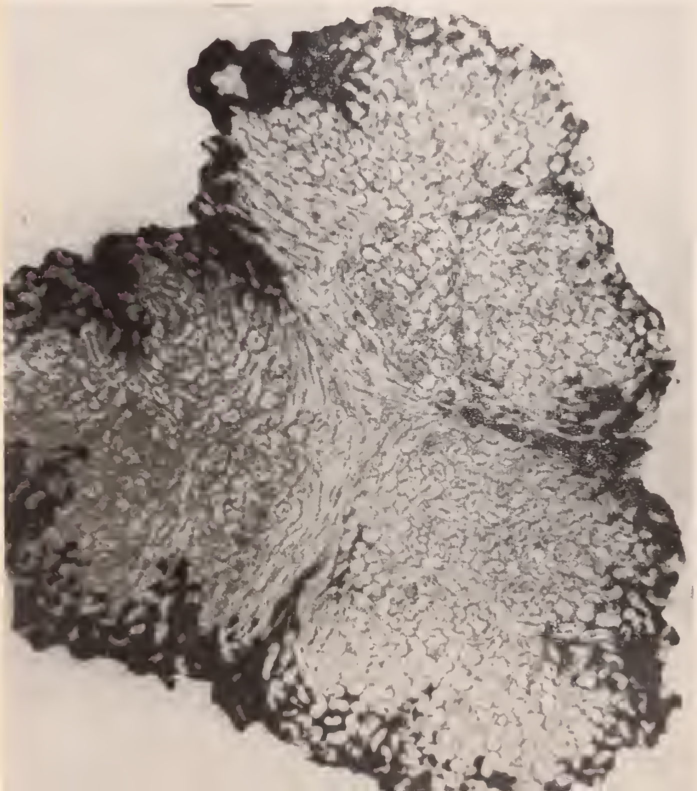
Cross-sections of two cotton tire cords, one unstretched and one "wet-stretched" show different arrangements of fibers. The wet stretching has brought about a more equal tension on the fibers and a compactness of plies. The unstretched shows looseness and fewer fibers parallel to the long axis of the cord.

A method of serial sectioning along the length of a cord (Fig. 3) has been successfully employed in the study of the intimate contact of fibers in yarns, plies, and cables. The relationship of these structural units one to another, as well as alterations due to mechanical treatments, have been studied by this method. Cords for such investigations are made of different colored plies; in this way, fiber alignment of individual singles and of plies may be easily followed. Somewhat in the same fashion, a method has been developed for serial sectioning or splitting of fabrics to study the contact, near the center of the cloth, of warp and filling yarns and to observe the manner of packing, the size and number of pore spaces in connection with water resistant fabrics.

The problems in textile microscopy vary from the examination of small samples of treated fibers to large specimens such as machine parts and spinning frame rolls. The utilization of the many instruments available, the electron microscope, the polarizing microscope, phase contrast accessories, bright and dark-field illumination, combined with the more conventional tests, provide ways and means for more clearly understanding and solving the problems of the textile industry.

T. L. W. Bailey, Jr.

Figure 2. Cross Section of 22nd Plane of Cotton Tire Cord. The black portion shows the degree of penetration of rubber into the cord.



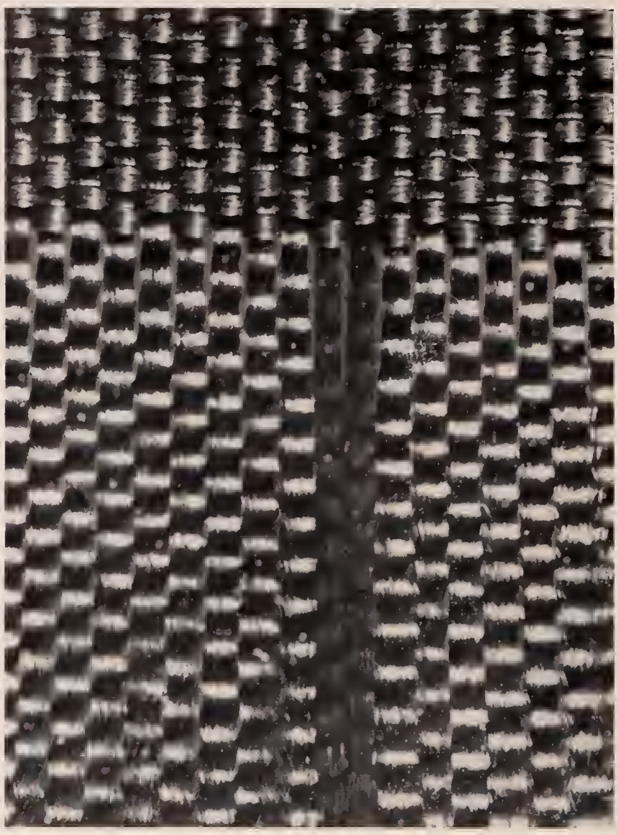


Figure 1. Shiners in Rayon Fabric. (Note the lack of crimp in the two adjacent yarns, indicative of unequal tension.)

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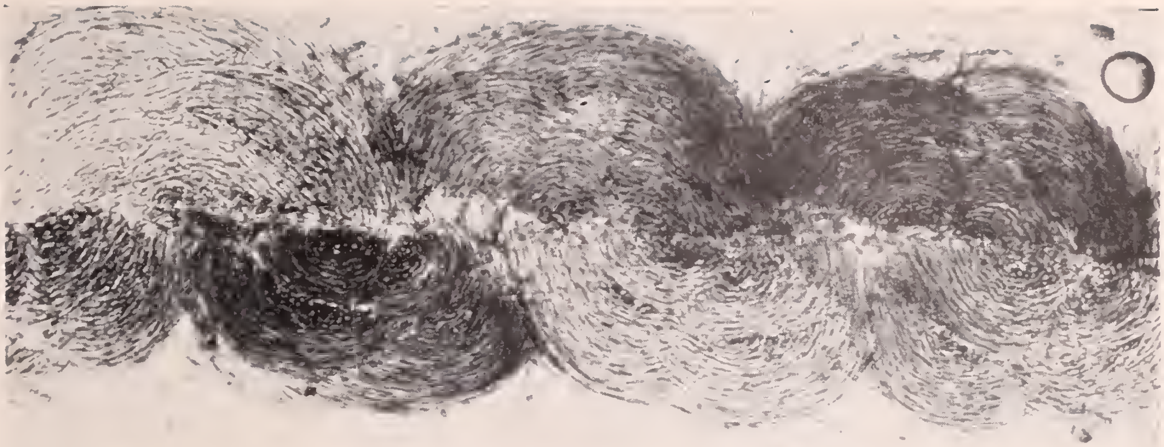

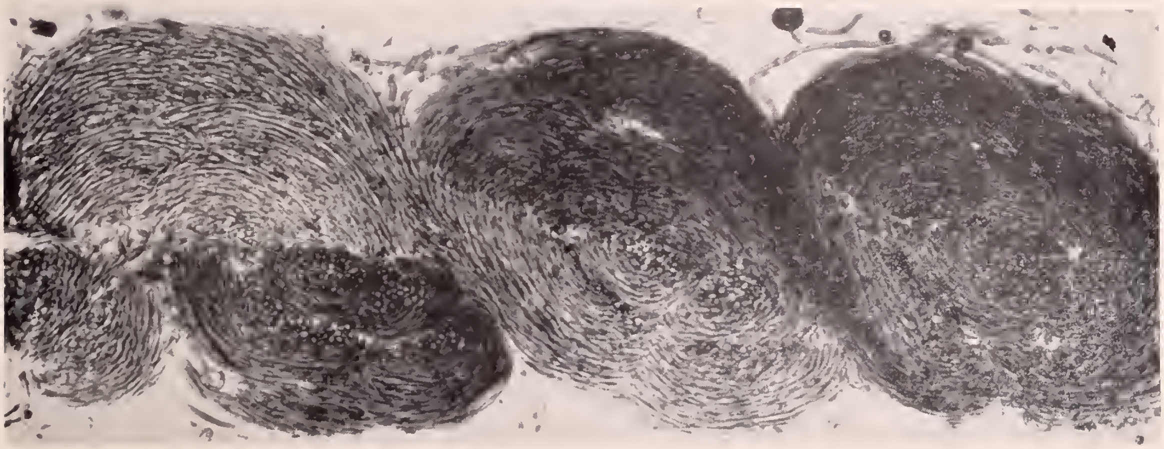

Figure 3. (top). Longitudinal section through the 22nd plane of 23/4/3 tire cord.
Figure 4. (bottom.) Cross section through the 24th plane of 23/4/3 tire cord 56 x approx.)

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News Around the School of Textiles

(Continued from Page 12)

sion a paper entitled "Small-Angled X-ray Scattering by Various Cellulose Fibers."

Another interesting and educational trip was made for the purpose of bringing up-to-date information to the Textile School by Professors Carson, Berry, Lathem, Hendricks and Hubbard. These energetic leaders in progress of the Textile School did not stop with a visit to one or two places for their educational information, they hopped all over the New England States.

COMPANIES LIKE CLEMSON MEN

If there is any doubt in the mind of any of the textile students as to their chance of getting a job when they finish at Clemson it can easily be removed by noting the number of companies who send representatives here for the purpose of hiring graduates. Another method of reducing their anxiety is to take a look at the number of Clemson men already employed by some of the local textile plants.

As an arbitrary example, the employment sheet of Deering Milliken's plant at Abbeville shows the following names of Clemson graduates and the capacity in which they are employed: planning department, Ben Barnwell, P. W. Bethea, Billy Quarles and Bill Gilmore; industrial engineering department, Phillip Rosenberg, George Dusenburg, James Botts, John K. Cheatham, A. B. Carwile, Jr., R. L. Calvert, Carwile McWhite, R. A. King and M. P. Blantchet; cost department, Clyde Simmons; preparation department, Tom Peden and Charles J. Glen; card room, Dewitt Benson; superintendent, weave room, T. D. Ferguson; overseer, dye house, Wilson Webb; in charge of laboratory, R. A. Link; training director and assistant personnel manager, A. B. Carwile, Sr.; personnel manager, T. J. Reames; president, Bob Edwards.

FILAMENT RAYON COMPLETELY PROCESSED

Professor Arthur E. McKenna, head of the weaving and designing department in the School of Textiles, is directing an experiment dealing with continuous filament rayon fabrics. The rayon will be processed from yarn to cloth, including warping, slashing, drawing-in, filling, winding and weaving. This is the first time continuous filament rayon has been completely processed at Clemson and everyone is hoping the experiment will be successful.

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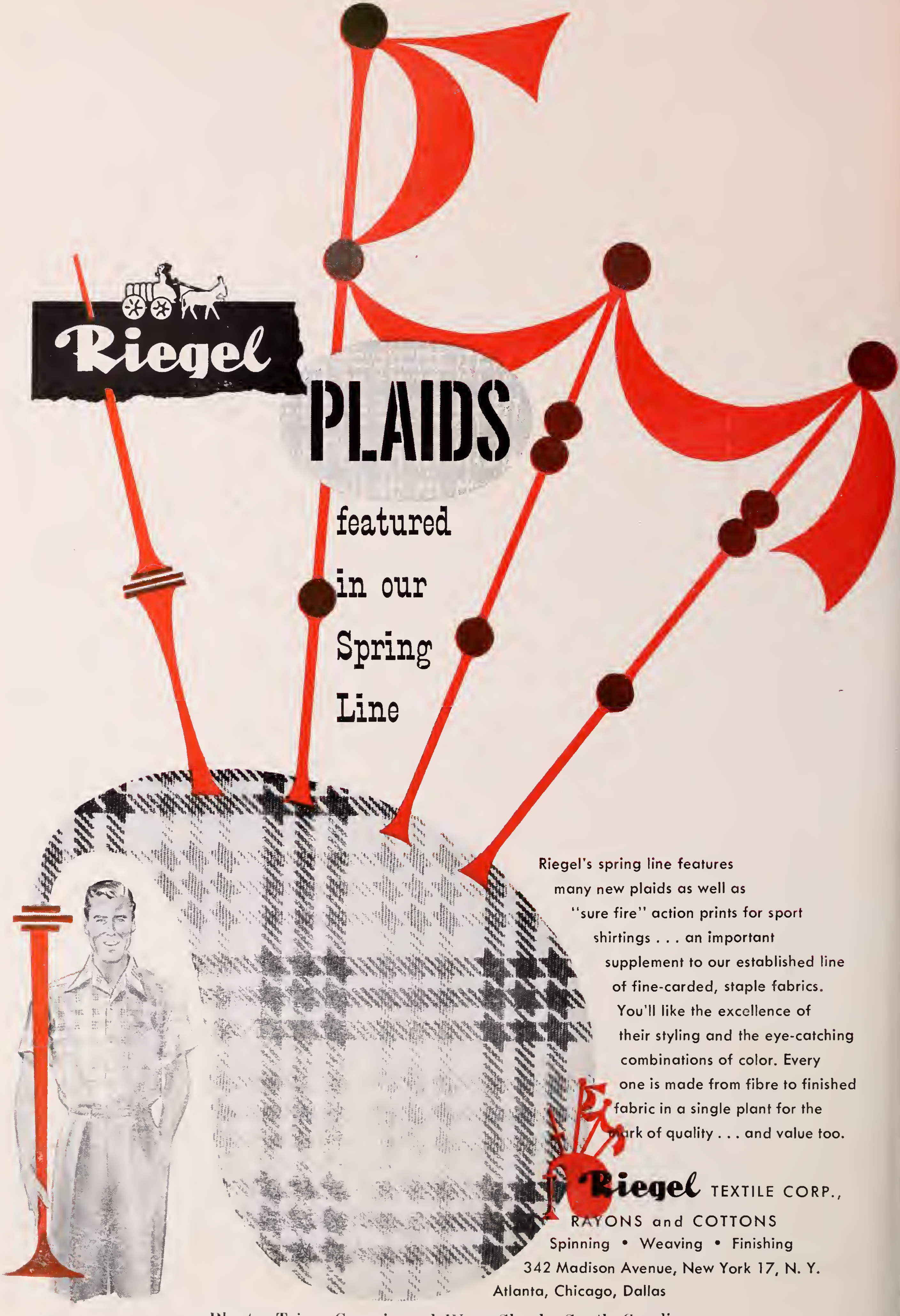

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STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

OL. 7 SPRING ISSUE, 1949 NO. 2

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THE

BOBBIN and BEAKER

Official Student Publication
Clemson Textile School

Vol. 7 Spring Issue No. 2

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Cotton's Increasing Competition From Synthetic Fibers And Paper

by Robert B. Evans, Special Assistant to the Director
Southern Regional Research Laboratory *
New Orleans, Louisiana

Although the plant and animal sources from which textile materials can be derived run well over a thousand, cotton for many generations has been used both in the United States and in the world more than all other fibers combined. Its position in textiles is roughly analagous to iron's role in metals. While the uses of other textile fibers have been more or less specialized, cotton has been the main standby for the bulk of mankind's textile needs.

Cotton always has had plenty of competitors for consumer markets, but in the past has more than held its own. During the last few years, however, two competitors —synthetic fibers and paper—have been making particularly successful incursions upon cotton's end-use markets. These attacks have been gaining rapidly in force, but their impact was not felt by cotton interests during World War II and the immediate postwar years, because of the huge demand for textiles of all sorts. But now that we are back again in a buyer's market, the story may be different.

Competition from Rayon

Rayon is the oldest and by far the most important synthetic fiber. The industry that produces it ranks high among America's best success stories. It is interesting in this connection that most of the leading rayon companies of the United States developed as offshoots of European rayon firms or via European licensing arrangements, although by now there is only one of our large rayon concerns that is not owned in this country.

Continued production of rayon, after a few unsuccessful attempts, started back in 1911, and there have been very few years since that time when the output did not show a large gain over the preceding year. The greatest advance has been during the last few years, however, with consumption increasing from the equivalent of 1.1 million bales in 1939 to the equivalent of 2.8 million bales in 1948. This record of continued growth has been based on continued improvement in properties, a downward trend in prices, and excellent merchandising.

During the last 15 years, rayon has been improved considerably in appearance, drape, softness, wrinkle resistance, color fastness, and washability, to name only some of the improved characteristics. Two specific developments, however, are directly associated with three-fourths of the huge production increase since 1939—first, rayon staple fiber; and second, high-tenacity rayon.

Until about 1936, practically all rayon was in continuous filament yarn form, similar to silk. Then rayon staple fiber, or rayon cut into short fibers, entered the picture and ever since has been increasing rapidly in importance. The lead in the development of rayon staple fiber

ROBERT B. EVANS

Born at Salt Lake City, Utah. Graduated with B. A. degree in economics from University of Utah, 1936, and an M. A. degree in economics from American University, Washington, D. C., in 1940. On the staff of the Cotton Utilization Section of the Bureau of Agricultural Economics, Washington, D. C., from 1937 to 1940, and on the staff of the Southern Regional Research Laboratory of the Department of Agriculture, New Orleans, Louisiana, since 1940. Author of studies on trends in the consumption of fibers in the United States, on cotton's end-use markets in bags, cordage and twine, etc., and on competition between cotton and synthetic fibers and paper.

"Although I did not have the good fortune of attending Clemson, I have had the privilege of being closely associated with several Clemson graduates, including R. J. Cheatham, Sr., John J. Brown, T. L. W. Bailey, Jr., and Roland L. Lee, Jr. If they, and the regard in which they hold Clemson are criteria, Clemson must be a really outstanding college."

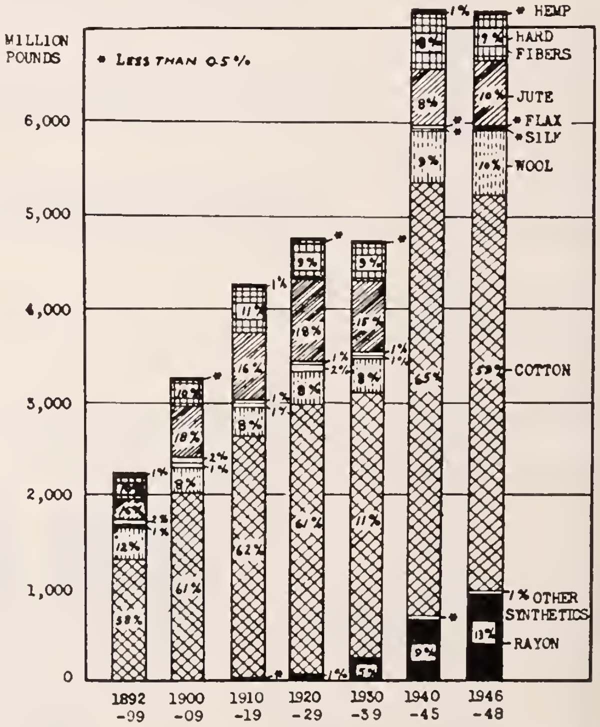

Figure 1. Average annual quantities of fibers made available for ultimate consumers in the United States, 1892-1948.

Although rayon's percentage of the textile market is steadily growing, cotton still is used more than all other fibers combined.

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*One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

was taken by Germany, Japan, and Italy, who, in an effort to free themselves of the necessity of using cotton, built up an output of 849 million pounds by 1939, out of a world total for that year of 1,082 million pounds. In the United States, expansion in the production of rayon staple fiber had proceeded at a more leisurely pace. But, as a result of the disruption of output in the former axis nations because of the war, the United States is now the world's largest producer of rayon staple as well as of rayon filament yarn.

The history of rayon from 1919 until about 1938 was one of continued reduction in price. The price of 150-denier viscose filament yarn per pound fell from a World War I peak of $4.77 in 1919 to 52 cents in 1938. The price of viscose rayon staple per pound dropped from 60 cents during 1828-30 to 25 cents in 1938. Despite these declines, cotton, at 10 cents a pound in 1940, had a tremendous advantage in price over rayon. But this situation changed rapidly during the next few years. Since 1945, cotton actually has been priced higher than viscose staple on a net "delivered-at-mill" basis. The price of acetate staple, always higher than that of cotton or viscose staple, was cut 6 cents per pound on March 1, following a 50-percent drop in sales during the first two months of 1949, as compared with a year earlier. Its margin of disadvantage in price compared to cotton and viscoes staple is now less than ever before.

In comparing prices of cotton and rayon staple, the textile engineer must keep several facts in mind. The most commonly used cotton quotation is the 10-market average, which does not allow for freight to the mill or brokerage costs. On the other hand, quotations for rayon staple are on a delivered-at-mill basis. Rayon staple is sold on a net-weight basis, while cotton quotations are on a gross-weight basis, making necessary an allowance of approximately 4.4 percent for tare. Still another difference is that cotton mills take a loss of about 10 percent for waste, after allowing for the sale or use value of usable waste, while the net waste in processing rayon staple is usually under 3 percent. Taking all of these factors into consideration, it was costing textile mills about 38.7 cents in March 1949 to buy as much Middling 15-16-inch cotton as they could get by purchasing viscose staple for 37 cents per pound or acetate staple for 42 cents per pound.

Still other considerations are involved in comparing rayon staple and cotton from a price viewpoint. Rayon staple sells for the same price regardless of fiber length, while the price of cotton varies greatly with length of staple. As a result of this situation, long staple cottons are at a considerable disadvantage in price competition with rayon, while the very short staples are actually slightly lower in price than rayon. Cotton prices also vary considerably with grade and character, while small premiums are charged for viscose staple if it is dull, or crippled, or is of the extra-fine, extra-strength type. It also should be mentioned that most rayon is made in yarn form and should, therefore, be compared in price with cotton yarns. Currently, coarse cotton yarns are priced slightly lower than rayon yarns, while fine cotton yarns are higher. The finer the yarn, the greater cotton's disadvantage.

How rayon will be priced in the future is of tremendous importance to both cotton farmers and cotton millmen. In order to secure data on this subject, the Southern Regional Research Laboratory of the Department of Agriculture made a detailed study of factors influencing the price of rayon. It was found that the rayon industry has been making substantial profits and that it is constantly finding new ways to do things more efficiently. It nevertheless has had its share of postwar inflation in its cost of doing business. The cost of building a new rayon plant is now twice as great as before the war. Wage rates in the industry have climbed from 65 cents an hour in 1938 to about $1.40 an hour at present. The cost of wood pulp and chemicals per pound of viscose rayon is now 14.7 cents per pound compared with 8.6 cents in 1940. A pound of viscose rayon staple, which cost 19 cents to make before the war and sold for 25 cents, now costs 29 cents and sells for 37 cents. From these and other data, it can be concluded that it would be difficult for the rayon industry to make reductions in the price of rayon of more than a few cents per pound.

Comparative prices of cotton, viscoe rayon staple, and acetate rayon staple, 1940-1948

Year	Cotton (M-15/16)		Viscose rayon staple 3/	Acetate rayon staple 4/
	10-Market quotation 1/	Price comparable to rayon 2/		
	Cents	Cents	Cents	Cents
1940	10.17	12.5	25	43
1945	22.62	26.7	25	38
1946	30.56	35.8	25	44
1947	34.43	40.5	32	48
1948	33.77	39.6	36	48
1949, Mar.	32.68	38.7	37	42

1/ Compiled from reports of Production and Marketing Administration, U. S. Department of Agriculture.

2/ Delivered-at-mill cotton quotations, U. S. Department of Agriculture, (not shown) multiplied by $\frac{.97}{.956 \times .90}$ where .97 is to allow for 3 percent net waste in spinning rayon, .956 to allow 4.4 percent tare on cotton bales, and .90 to allow for 10 percent net waste in spinning cotton (after allowing for value of usable waste).

3/ Bright luster, regular tenacity, all lengths. From Rayon Organon.

4/ All lengths, bright and dull. From Rayon Organon.

As its quality and price position has improved, rayon has been able to expand into more and more textile markets. This expansion has been abetted by an excellent merchandising program, including advertising, quality control, technical sales help, and publicity and education. Consumption in women's clothing, always rayon's most important end use, has continued to increase; and, in addition, rayon has made considerable headway in men's suit linings, summer suits, sport shirts, and slacks. Before World War II, hardly any rayon was used for industrial purposes; but it is now used in large quantities in tire fabric. During the fourth quarter of 1948, for the first time, more rayon tire was produced than cotton tire fabric.

This invasion of rayon into tire fabric is of particular concern to the cotton industry. Before World War II nearly all tire fabric was made of cotton. Tire fabric still required 750,000 bales in 1948, a staggering $117 million worth of cotton—and about as much cotton as was grown that year in Georgia or Louisiana. But the alarming aspect of the inroads of rayon, from the viewpoint of the cotton producer, is the fact that rayon tire fabric is priced considerably lower per yard than cotton tire fabric. In addition, manufacturers say that although in passenger car tires there is little, if any, quality difference between cot-

(Continued on Page 16)

Robert Knight Eaton

In Memoriam

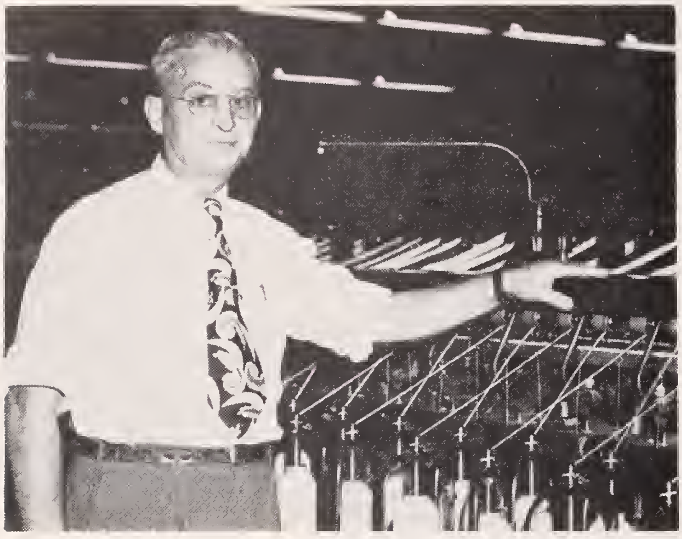
Professor Eaton, Head, Carding and Spinning Department; former acting Dean of Clemson Textile School; Head, Textile Placement Bureau; and faculty advisor to Bobbin and Beaker died recently at his home at Clemson.

Professor Eaton was a favorite of the students because of his cheerful smile, competent advice and willingness at all times to help any student in any way. He is greatly missed by all in the Textile School

He was born July 31, 1883, in Providence, R. I., and spent his early years in Brunswick, Maine. He was a graduate of Bowdoin College in 1905 and was a member of the Delta Kappa Epsilon Fraternity there. He went on to do graduate work at Philadelphia Textile Institute, later working as a textile engineer with Whitin Machine Company at Whitinsville, Massachusetts, and with Cabot Manufacturing at Brunswick, Maine.

During World War I, he served as a First Lieutenant in the Chemical Warfare Service. In 1923 he came to Clemson as a professor of Weaving and Designing, and served as a faculty member until his retirement on February 1, 1949.

Roving Frame Stop Motion



Mr. S. J. Adams of Abbeville, South Carolina, is the inventor of and holds Patent No. 2,129,639 on a simple stop motion for roving frames that not only cuts cost of roving but insures a better product so that savings are effected in spinning and weaving and better cloth is produced.

While stop motions on drawing frames have long been standard equipment and have been considered essential to the drawing of an even sliver of correct weight, roving frames have never had satisfactory stop motions adapted to their more complicated mechanism. Roving frames are, of course, equipped with knock-off levers which automatically disengage the pulley or the motor when the bobbin is full, but it has been necessary for the attendant to keep a watchful eye on every spindle to make sure that the roving is running properly. Singlings, doublings, broken ends, plugged flyers, bad piecings and roll laps are expensive and time consuming.

A new and simple roving frame stop motion has been invented and developed by S. J. Adams of Abbeville, South Carolina, which stops the frame as soon as there is any defect in the roving being delivered to the bobbins. The device has been successfully applied in several mills and is now ready for use on any type of frame and on any fiber or mixture of fibers.

Design:

The Adams Stop Motion consists of a drop wire with an eyelet at one end through which the roving runs. The other end of the drop wire goes through a slot cut in the roll beam flange directly below each front roll. The drop wire is mounted on an insulated pivot just below its slit in the frame, and when no roving is passed through the eyelet, the wire is free to pivot until it rests against one side or another of the slit in roll beam flange. While in such a tilted position, it closes an electric circuit which shuts off the frame. When, on the other hand, the tension of the roving holds the drop wires in an upright position, the electric circuit is open and in no way influences the normal operation of the machine.

It had been thought that drop wires could not be used on roving sliver delivered from the front roll of a roving frame, for there is very little twist in the roving sliver at this point and it is so weak that the weight of the wire would stretch and eventually break it. The drop wire used in this stop motion, however, is designed to have its weight supported on the pivot, but is held on balance by the roving sliver. Since the wire does not hang down from an end, as does the drop wire on a loom stop motion there is no tendency for the roving sliver to be stretched In spite of this light touch, the action of the drop wire will act on the slightest defect in delivery.

The drop wires do not necessarily have to be mounted on the frame itself; they may with equal ease be mounted on a bracket positioned at any convenient spot. For each different type roving frame, the stop motion is applied differently so far as the length of the wire is concerned but the method of operation is the same.

Operation:

The action of the stop motion is fully automatic. I need not be tended in any way. If it stops the machin at any time as the result of some fault in the delivery o the roving sliver, the trouble is merely located and rectified and the ends rethreaded through the drop wire an the flyer.

Ends Down:

When an end breaks or becomes slack, the drop wi will move from its center of gravity, fall over and mak contact with the roll beam flange, thereby completing a electrical circuit which in turn cuts off the main pow to the frame.

Doubling:

When an end breaks and falls on a running end, t frame will be stopped, for as soon as the tension on t roving falls below a minimum, the drop wire will revol on its pivot, make electrical contact and stop the frame. the tension is taken up immediately by the roving bei pulled along by the running end, the angle will be su ficient to pull the drop wire against its contact and st the machine.

Singling:

The action of this stop motion is adjusted so that

(Continued on Page 15)

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PHI PSI

PHI PSI, the oldest fraternity on the Clemson campus, has just had the pleasure of initiating thirteen new "worms". They are: B. R. Adams, Anderson, S. C.; H. G. Allison, Jr., Gaffney, S. C.; W. M. Brown, Greenville, S C.; J. F. Cathcart, Bishopville, S. C.; Coy J. Gray, Anderson, S. C.; H. B. Hatfield, Sumter, S. C.; L. O. Herd, Greenville, S. C.; N. A. Howell, Atlanta, Ga.; C. O. Lamoreux, Spartanburg, S. C.; D. L. Moyd, Ninety-Six, S. C.; T. E. Perry, Anderson, S. C.; B. K. Sutton, Greenville, S. C.; and B. E. Taylor, Greer, S. C. It is a pleasure to welcome these men into the fraternity and challenge them to uphold the high standards of Phi Psi.

Iota Chapter has been busy with work as well as fellowship. Our work has centered around our projects, which we plan to take to the Annual Convention in May. They are jacquard, knitting, dobby and dyeing projects. Our fellowship has centered around several steak suppers at the steak house in Walhalla, S. C. At present we are planning on having a big time at our annual spring banquet, which is to be held April 29th at the Hotel Greenville, Greenville, S. C.

It is with regret that we say that our Faculty Advisor Professor W. G. "Pop" Blair is ill at his home. It is the wish of the chapter that he get well soon and be able to attend the convention in Atlanta with us.

Floyd Griffin, President of Iota Chapter of Phi Psi, was recently elected a member of Blue Key, national honorary leadership fraternity.

Burlington Lends A Hand

By JOE CLANCY

Mr. "Joe" shows the author, left, and Mac Keasler, right, fadeometer results on rayon.

There is a good cause for Mr. "Joe" Lindsay to be quite happy about the recent turn of events which have enhanced the Textile Chemistry Department of which he is head. Only recently it was announced that the Textile School at Clemson College was to receive a donation of $10,000 from the Burlington Foundation, a trust established by the Burlington Mills Corporation. The gift was presented to Dean Brown by J. E. Garvin, Clemson 1920, now vice president in charge of production for the Burlington chain of mills.

Early discussions of this grant were participated in by Dean Brown, Mr. Lindsay, Mr. Gage, and Mr. McKenna, Mr. J. E. Garvin, and Mr. Butler French of Burlington. The present plans are to use this donation to equip a dyeing and finishing laboratory in which actual productive processes and problems will be duplicated. It is thought that upon completion of this installation, it will be possible to take the average natural and synthetic fabrics from the "grey goods" through to the finished products. During the coming summer, bids will be received for the installing of this equipment, and construction will begin dependent on the availability of space in the textile chemistry department. When this section is put into final operation it will be classified as the "Burlington Finishing Laboratory".

The rapid growth of textile finishing operations in the South, during the past few years, makes the establishment of such a laboratory timely. This will give the textile chemistry majors a much more accurate picture of the new machinery which is being used in the industry and better fit them for assuming their positions upon graduation.

This donation to Clemson, Burlington Foundation officials stated, is in line with the Foundation's policy of making gifts to colleges to improve existing facilities and establish needed new ones. Primary consideration in making these donations is the need of the institution in question and the use to which the donations will be put.

Mr. Joseph Lindsay, or Mr. "Joe" as he is affectionately referred to by students in textile chemistry, had quite a varied career before coming to Clemson in 1935 to assume the position as head of the Textile Chemistry Department. During his fourteen years as class adviser to the "skein dyers", he has sent many men into the industry who look back with thankfulness to the knowledge and friendliness that they received from Mr. "Joe".

This gentleman's interest in textiles was not predominant at first, for he graduated from Erskine College with an A. B. degree in Chemistry in 1919 after being captain of the football team the previous fall. It need not be added that carrying the pigskin in those days was quite different from today, for the "T" and other variations had not then been introduced. Nevertheless, Mr. "Joe" was directing the plays from quarterback and leading his teammates through lines which made his weight look slight. In the

(Continued on Page 14)

Nylon As A Textile Fabric

By NATHANIEL A. HOWELL

Nylon is fast making a place for itself in today's textile field. Each day new uses and applications are found for this synthetic textile fibre. Nylon was first discovered about twenty years ago by Dr. W. Carothers, who was doing research work for the Du Pont Company. Its discovery was quite accidental and it was not introduced to the public until ten years later.

All the nylon in use today is manufactured by Du Pont. While this company actually makes the nylon itself, it does not weave, knit or otherwise transform it into readiness for everyday use.

The starting point for the manufacture of nylon is the nylon salt, which is received by the plant in a water solution. This makes it easier to transport. After reaching the plant, a certain amount of the water is evaporated from the solution. When the correct concentration is attained, the solution is transferred to an autoclove where it is heated at a preset temperature and pressure. This heating under pressure is what combines the small nylon molecules into larger ones. Next, the molten nylon is cooled by a shower of water. After it hardens it is dried and chopped into flakes.

If it is to be made into a continuous filament, the flakes from several batches are mixed and blended in order to attain uniformity and is again melted. The nylon is now forced through a number of small holes in a spinneret under a very high pressure. Upon emerging from the spinneret, the molten nylon is usually passed through a jet of air so that it will cool and harden. Some of the larger filaments cannot be cooled sufficiently in this manner and must be passed through a tank of water.

After being drawn out and wound on bobbins, the nylon filament is ready to be shipped to a manufacturer to be converted for one of its many uses.

Only recently has nylon been made available on staple form. The strands are drawn out, crimped, and cut in staple lengths. In this form, it can be handled like wool or cotton.

Nylon was first used commercially as a tooth brush bristle, and during the war it was used for making parachutes and rope in which extra strength was desired.

Since the war many uses have been found for nylon. These include tirecord, nets, rugs, sweaters, socks, upholstery, women's underclothing, and other fabrics.

One very desirable trait that a nylon fabric possesses is the fact that its shape can be permanently set. Once given their desired shape, the fabric will hold it indefinitely. Therefore, sweaters, stockings, socks, or other garments will regain their original shape after being washed. Nylon is also known for its quick drying qualities.

Nylon will never take the place of cotton in the textile field, but it offers a challenge as well as an opportunity to the modern textile man to introduce it into his plant.

Nylon's usefulness is just beginning to be discovered, and its future promises to be a bright one.

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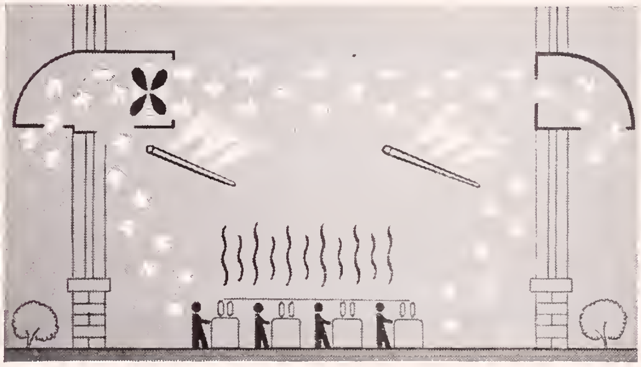
HUMIDIFICATION and COOLING



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Cotton's Stake In The Bag Market

by **NORMAN E. ELSAS**

President Fulton Bag & Cotton Mills

Atlanta, Georgia

Until the formation of the National Cotton Council of America, with its headquarters in Memphis, Tennessee, the United States Department of Agriculture and the Census Bureau under the United States Department of Commerce were the sole sources of data as to the fields into which cotton grown in the United States found its way. These reports were most disjointed and not particularly useful because of the manner in which the data was collected.

Since one of the major objectives of the National Cotton Council was to benefit all of the various factors in the industry, from the farmer who grows cotton right on through to the manufacturer of yarn and cloth, it was apparent that accurate information as to the uses of cotton was essential. The Council felt that by determing the uses, broken down into major categories, it could then assist in determining how to expand the use of cotton and make it a permanent and stable source of income to the farmers and other groups who make up the National Cotton Council—who are the ginners, the warehousemen, the compressors, the cotton seed crushers, and the spinners.

The first year in which the analysis of uses was completed, showed that the greatest poundage of raw cotton was used by the tire manufacturers. The next largest use was for cotton bags! This came as a surprise to everyone connected with the industry, including the manufacturers of cotton bags. In round numbers, cotton bags have required the use of approximately 10% of the domestic consumption of cotton averaged over a number of years. (Bear in mind this is not the domestic production of cotton, but the domestic **consumption** of cotton, because this country has consistently exported a very high percentage of its production to other parts of the world.)

Ten per cent, when read quickly, does not seem like a very large amount, but when it is noted that all the cotton used in towels amounted to only about 3%, and in sheets and pillow cases to only about 5%, then the use of cotton in bags stands out as an important factor.

Of course, the uses of cotton are myriad. It was so difficult that the National Cotton Council had to stop when it got down to a fraction of 1%, and at that time had a tremendous number of classifications. Without attempting to list them, but simply to mention some of the unusual fields of the usage of cotton which do not immediately come to mind, are gloves, tapes, shoe linings, pockets, typewriter ribbons, etc.

An increase or decrease of 1% in the consumption of cotton bags is really more than some very important items which are well known—such as overalls and coveralls.

Therefore, to the entire cotton industry, the maintenances of a good market for cotton bags is of primary importance.

Of course, it is impossible always to maintain cotton goods flowing into the market in the form of bags. A brief example will indicate this—take table salt. Up until the late '20's, most of the table salt that was available in grocery stores was put up in small cotton bags. They were made of relatively light fabric, but they served the purpose and consumed altogether a very considerable volume of cotton. Because of salt's normally hygroscopic nature, and also because of its use in relatively small quantities, the producers turned to a package that would be more acceptable to the housewife. There are a number of other items that fall in this category.

Another basic economic change accounts for a large volume of cotton that formerly went into bags for 5 lbs., 10 lb., 12 lb., and 25 lb. of flour. In the very small sizes, flour is now packed almost automatically in either paper bags or cartons. In quantities of from 10 lbs. to 25 lbs., there are relatively few households that have need for so much flour at a time; the reason—growth of bakeries and delivery by bakeries of the various products made from flour. Not only does the housewife save the effort and trouble of baking, which is certainly no simple task, but she is also saved the trouble of mixing, washing pots and pans and mixing bowls, and carrying on hand many of the ingredients that the housewife felt were necessary to add for her own particular baking. Even in rural districts, better roads and the access to bakery products in communities, if not from delivery trucks, has further curtailed the use of flour in small packages. On the other hand, the use of flour in large packages—for example, 100 lb. size—has increased in proportion to the increase in the number of bakeries. Unfortunately, all of this flour has not been going into cotton bags, but a considerable proportion of it has been going into paper bags. It is at this point that many mills and manufacturers of cotton bags have seen the necessity for making careful analyses from the economic standpoint.

Even at the present relatively high price of cotton bags, as compared with paper, still the salvage value of the fabric used in a cotton bag makes the continued use more economical for the baker than to accept flour in paper bags.

Of all the bags made, by far the greatest yardage of cotton goods is consumed in the manufacture of bags for feedstuffs of all kinds. These include dairy feeds, chicken feeds, rabbit feeds, etc. Nearly all of these feeds are bulky and require a relatively large bag to carry the usual quantity of 100 lbs. Not only does cotton fabric lend itself to this service, but, in addition, the piece of fabric left after the feed is used out of the bag is of a desirable size. The industry—to make these fabrics even more desirable to women who like to use them for home sewing, etc.—now furnish these bags in attractive prints. Not only that, but many different constructions of fabrics are used for this purpose to further their appeal from the standpoint of style and appearance.

These print bags are an outstanding example of some of the things that can be done to maintain the flow of cotton into the bag market.

Frequently, there have been articles published and speeches made about the loss of the market for cotton bags that formerly carried cement. Rather peculiarly, this market has not disappeared altogether, though it has shrunk materially, and the shrinkage, instead of being caused by paper bags, has been caused by the shipment of cement in bulk. This, in turn, has actually cut into the use of paper bags as well.

Sound economics will generally control in all matters of this kind, with due regard to "style", which is much more of a major influence on all of us than we would like to admit. If cotton proves to be more serviceable and desirable from an economic standpoint, and also can be "styled"—then with proper promotion and intelligent planning there should be—as far into the future as we can now see—an excellent market for cotton in the form of bags.

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Progressive Development Of Textile Machines

By **BOB RICE**

Cotton helped bring in the new textile machines. For thousands of years there had been few changes in the technique of making cloth. Within the space of one hundred years, spinning and weaving were to be speeded up one thousand times. Machines were to be invented that could be tended by children (to their misfortune). John Kay, with his fly shuttle, was to start a sort of tag game between the spinners and the weavers; first the spinners could not make yarn fast enough for the weavers, and then the looms were not fast enough to use up all the yarn that the spinners made.

John Kay was a weaver who wanted to make wider cloth and to make it more quickly than was possible on the primitive loom. To do this, he saw that it would be necessary to invent something that would throw the shuttle through the shed faster and for a longer distance than the weaver's arm could throw it. After many efforts, Kay succeeded in making a springing hammer that would do this. Because the shuttle seemed to fly back and forth of its own accord he called his invention the "fly shuttle". When Kay speeded up weaving with his fly shuttle one thing occurred that he had not expected. Weavers were able to use up yarn faster than spinners could make it. The weavers had to tramp from house to house trying to buy enough yarn for their looms. Spinners could get a high price for their work and were in no hurry. The need of the weavers for more yarn caused the invention of a number of machines for spinning.

When Kay invented the fly shuttle loom, spinners were still making thread on spinning wheels. James Hargreaves, an English spinner, knocked his spinning wheel over one day and observed that the wheel continued to turn the spinning as it lay on its side. Hargreaves saw that with the wheel in this position it would turn a number of spindles at one time. He set to work in secret, and by 1767 had made a spinning machine that would turn a number of spindles at one time. The spinning jenny, as Hargreaves called his machine, made it possible for thread to be made much more rapidly than before. It could not, however, spin thread that was tight and strong enough to be used for the warp, the lengthwise threads mounted on the loom among which the softer filling threads are woven. Weavers still had to stop work and wait on slow hand spinners for their warp yarns.

Richard Arkwright, a young barber who traveled about the countryside buying the long hair of country girls (to be used in wigs worn by ladies and gentlemen of fashion) heard spinners complaining about the faults of the spinning jenny. As Arkwright listened to the spinners an idea began to take form in his mind. He set about making a spinning machine that would make strong thread, and make it quickly. By 1771 Arkwright had not only invented a better spinning machine than the jenny, but had become the owner of a successful spinning mill. His machines were too heavy to be worked by manpower, and were run by horse-power or by water-power.

In 1779 Samuel Crompton, a weaver, combined the good points of the spinning jenny and the horse-power frame into a spinning machine that he called a "mule" spinning frame. Crompton remembered how spinners had destroyed the machines made by Kay and Hargreaves. In trying to avoid their mistakes, Crompton sold his invention to a group of manufacturers, who made a number of the machines and never paid Crompton at all for his idea.

The "mule" was a very good spinning machine in every respect except that it took skilled workmen to tend it. Mule spinners knew they could not be replaced by untrained workers. Their demands for high wages caused the manufacturers to look about for a man who could make a spinning frame that an unskilled worker could tend. In 1830 Richard Roberts invented such a machine, called the "self-actor mule". Even women and children could tend this machine. In 1832 another easily tended spinning machine was invented by an American worker named Jenks. This machine was called the "ring" spinning frame.

Each spinning machine could now spin twelve hundred times as much in one day as could be spun on a spinning wheel. The spinning machines called for more cotton. In 1792 Eli Whitney, a young school teacher from New England, was asked to try his hand at inventing a machine to clean the seeds out of cotton fiber. The story goes that while he was thinking about this problem, Whitney saw a cat reaching through the bars of a chicken coop, trying to pull the chicken through but only succeeding in getting its claws full of feathers. It occurred to Whitney that the way to separate the cottonseed from the fiber was to pull the fiber through an opening too small for the seed to go through. The first model of his machine was a drum set with wire hooks that turned against a grate, on the other side of which seed cotton was passed. The wire hooks caught the passing fibers and pulled them through the grate, which was too fine to allow the seeds to follow. The cotton fiber could then be brushed off the hooks.

Whitney called his invention the cotton "gin" (short for engine). It was a great success from the start, and was highly praised by such men as Thomas Jefferson and George Washington. Whitney wanted to patent his idea and manufacture the machines himself, renting them to cotton producers. But the gin was too important to be kept in one man's hands. It was immediately copied so widely that his patent was worth little to him, and it took him a long time and many lawsuits to make any profit from his extremely valuable invention.

Kay's fly shuttle loom, that had started this race for more thread and more cotton, did not have any serious rivals from the time of its invention in 1733 until after 1785, when Edmund Cartwright, a minister, invented his power loom. Everyone laughed at Cartwright for thinking that a machine could ever take the place of human fingers when it came to weaving. Edmund, who did not like to be laughed at, decided that he would make a weaving machine, just to show them he was right. In his hurry, the minister did not even stop to study the parts of a hand loom. He invented a weaving machine, took out a patent on it, and then discovered that his machine was much harder to use than was the ordinary hand loom. After six more years he had worked out an automatic machine that could be more easily handled and had set up a factory to make looms for textile factories at Manchester.

His troubles were not over. Textile workers knew that the new loom would be able to weave more cloth in a day than they could weave in a week. They tried to destroy all the machines, but, although they caused Cart-

(Continued on Page 17)

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Burlington Lends a Hand

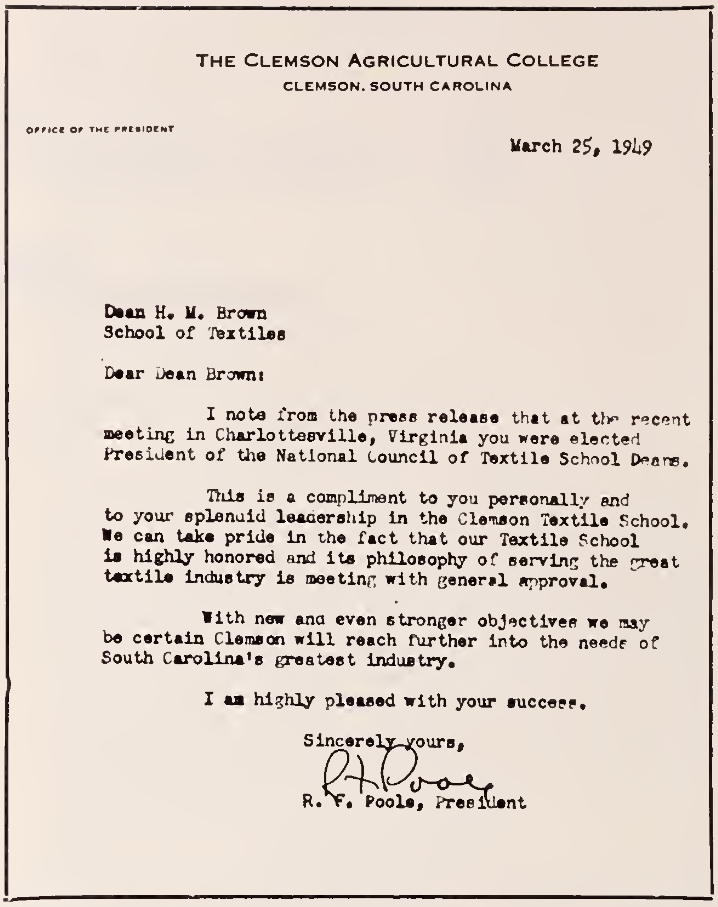
(Continued from Page 8)

spring, "a young man's . . . . ," but to Mr. "Joe" it turned to baseball, and here again he earned a letter chasing flies in the outfield. During the fall of 1919, who was the coach at Erskine but this same man.

After leaving Erskine Mr. Lindsay sold insurance until 1923, at which time he entered the University of North Carolina and in 1924, the University of Chicago. At these two schools, additional chemistry was studied and a year's special work in textile chemistry at Philadelphia Textile school was completed in 1925. Mr. Lindsay completed his work for a masters degree at the University of Tennessee in 1945.

After leaving Philadelphia Textile School, Mr. Lindsay accepted a position as laboratory assistant for General Dyestuffs at their Charlotte office. In four years he became head of the laboratory and held this post until he came to Clemson as head of the Textile Chemistry Department in 1935. At the time of his arrival, the Textile Chemistry staff was composed of two men, whereas now it has grown to five.

While actively assisting embryo textile chemists, Mr. Lindsay has also found time for many other activities. Prior to World War II, he was a lecturer at the Ciba dyestuff school in New York every summer for five years. At present he is a member of the American Association of Textile Chemists and Colorists, the Fiber Society, Southern Textile Association, and Phi Psi fraternity.



THE CLEMSON AGRICULTURAL COLLEGE
CLEMSON, SOUTH CAROLINA

OFFICE OF THE PRESIDENT

March 25, 1949

Dean H. M. Brown
School of Textiles

Dear Dean Brown:

I note from the press release that at the recent meeting in Charlottesville, Virginia you were elected President of the National Council of Textile School Deans.

This is a compliment to you personally and to your splendid leadership in the Clemson Textile School. We can take pride in the fact that our Textile School is highly honored and its philosophy of serving the great textile industry is meeting with general approval.

With new and even stronger objectives we may be certain Clemson will reach further into the needs of South Carolina's greatest industry.

I am highly pleased with your success.

Sincerely yours,

R F Poole

R. F. Poole, President

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(Continued from Page 6)

case of a singling from drawing the drop wire will sag over and make contact, stopping the frame as described above.

Bad Piecing:

This stop motion will stop most thick piecings from drawing when the piecings reach the drop wire. When these thick piecings hit the drop wire they will usually plug up the eye and cause the end to break. Light drawing will naturally run slack so the drop wire will pull over and make contact. In fact, when the stop motion was first tested, it cut off the machine so often that it was felt that there must have been something wrong in its operation, however, the trouble was traced back to bad piecing of ends at drawing. When the cause was located and the trouble eliminated, the sliver ran into the roving frames smoothly and the stops decreased. A much better sliver was drawn and this resulted in an improved product all down the line.

Roll Laps:

If the roving begins to lap around any roll, the drop wire will fall and make contact and stop the frame because there is no running through it to hold it in an upright position. Roll laps are stopped almost as soon as they begin. Without use of the stop motion, flying mandrels are not uncommon and are dangerous when they fall out of the stand and are broken by the flyer.

Plugged Flyers:

When a flyer becomes plugged, the tension will slacken and the frame will stop, thus eliminating the stretched roving that is ordinarily produced when the flyer is partially plugged.

When Sliver Runs Out:

The stop motion will stop the frame when the sliver runs out and will allow the operator to creel in a new can. On a roving frame not equipped with a stop motion, the frame will continue to run until the operator returns on his regular patrol cycle. In many instances, the frame will have run until the correct tension cannot again be obtained on the spindle and that end will have to be broken back for the rest of that doff.

Full Production:

When an end comes down on this stop motion, the frame will stop and cannot be restarted until the end causing the stop is put back up. An attachment is put on builder motion so the frame will not stop on the change, but will continue to run until the carriage has changed direction. This prevents the stop motion from stopping on a change which would of course cause numerous run-overs, and prevent the operation of the machine for so long a time after an end is down that production is lost. This attachment insures that proper tension will be maintained during the doff and by avoiding run-overs, full frame production is assured.

Correct Tension:

Correct tension is essential to the delivery of good roving. This proper tension is obtained automatically when the frame is adjusted to the minimum tension necessary to keep the drop wires in a vertical position. Unless the lay and tension are correct, the drop wires will not permit the machine to run. Often, on machines not equipped with the stop motion, frames are run with too little tension on the roving so that an inferior product results and the full bobbin does not weigh as much as it should.

It is possible for an operator to handle more frames equipped with stop motion than without. Also, the roving delivered to the spinning room is of such quality as to reduce ends down, which in turn means that one operator can handle more sides and produce better quality work to deliver to Winding, Warping, Quilling and Weaving.

Most experienced mill men know the importance of uniform sliver and roving. They also recognize the importance of a stop motion on drawing frames, warpers and looms, therefore, we are confident that when the practical mill men see the roving stop motion in operation, they will be convinced that it is just as important to have a stop motion on roving frames as on the machines mentioned above.

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Cotton's Increasing Competition

(Continued from Page 3)

ton and rayon, in truck tires rayon gives better service than present commercial cotton fabrics. With this the situation, tire manufacturers have been using all the rayon fabric they could obtain. In addition, because of the huge demand for tires they have also been finding it necessary to use record-breaking quantities of cotton tire fabric.

In the spring of 1949 the rayon industry was curtailing operations because of lack of orders for the first time since prewar. It nevertheless faced the future with a greatly expanded market compared to prewar, with improved products, and its former disadvantage in price compared to cotton wiped out. Although consumption of cotton was still nearly four times that of rayon, it was obvious to the cotton industry that it must fight to keep from losing any more markets to the rayon producing industry.

Synthetic Fibers Other Than Rayon

Until about 1935, rayon was the only manufactured fiber in commercial production. Since then, several other synthetic fibers have appeared as competitors of cotton. Combined consumption of these new synthetic fibers rose from 4.5 million pounds in 1940 to about 70 million pounds last year. Although the latter figure is the equivalent of only about 160,000 bales, it is already greatly in excess of the consumption of silk or flax in this country.

Nylon holds first place among the new synthetic fibers, accounting for more than half of the combined production. The group also includes Vinyon and Saran, both made of synthetic resins, glass fiber, and protein fibers. A protein fiber made of casein was produced from 1940 to 1948 when the plant was sold to another concern which is now producing a zein (corn protein) fiber. Not long ago, Du Pont announced construction of a new plant at Camden, South Carolina to produce Orlon (polymethacrylonitrile) fiber. Several other companies have other experimental fibers which they are grooming for a place in the textile industry.

Some of the new synthetic fibers have such characteristics as high strength, elasticity, and durability, and seem assured of a bright future in textiles, while others appear to be suitable only for specialty uses. Some of them are moisture-proof, which is a major advantage for some uses, although a decided disadvantage for others. All are priced considerably higher than cotton or rayon, and it appears, from the nature of the raw materials and manufacturing operations involved, that they will continue to fall into a higher cost bracket than either of these fibers. Nevertheless, a tremendous amount of research and developmental work in the aggregate is being spent on them, and it can be expected that their quality-price position will improve. It is only reasonable to believe that they will make a stronger and stronger bid for textile markets in the years to come.

Paper as a Competitor of Cotton

Less than 10 percent of the total paper consumed in the United States is used for products that compete directly with cotton. Paper has been an aggressive competitor of cotton in recent years, however, particularly in such products as bags, towels, handkerchiefs, napkins, window shades, plastics, twine, and now draperies. Consumption of cotton in bags, cotton's second most important end use, climbed from 548,000 bales in 1940 to an all-time peak of 820,000 bales in 1943, under the pressure of a large wartime need for bags and an acute shortage of burlap. But thereafter consumption declined to 448,000 bales in 1947, despite an increased total market for bags. In the meantime, the output of paper for shipping sacks increased from 195,000 tons in 1940 to 315,000 tons in 1943, then continued to increase to 570,000 tons in 1947 and to 667,000 tons in 1948.

Over the years, paper bags have become better and better adapted to users' requirements as a result of an aggressive research program. In addition, paper bags benefited during the immediate postwar period, from skyrocketing prices for cotton bags. Paper bags always have had a lower cost than cotton bags, but they are nearly worthless after being used once, while cotton bags frequently make several trips or eventually may be reincarnated as someone's house dress or dish towel. The net cost of using cotton bags compared favorably with the cost of using bags through World War II, soared to much higher levels in late 1946 and 1947, but was back down again at the beginning of 1949. The National Cotton Council and the Textile Bag Manufacturers' Association currently are conducting a successful campaign to promote the use of cotton bags, based on their value for re-use purposes.

Cotton's Future Promising

Despite the increasing competitive strength of its rivals, there are several reasons for believing that cotton's future is bright. The cotton industry is well into its greatest revolution since the invention of the cotton gin. Mechanized production means that cotton will be produced at a far lower cost in terms of human effort in the future than it has been in the past. In fact, it appears that cotton can be grown at a much lower cost than seems possible, at least yet, for the production of any man-made fiber. Since price is a decisive factor in many textile end-use markets, the importance of this advantage is tremendous.

A second promising factor in cotton's battle to maintain its markets is the improvement being made in its quality. At present, not more than 4 million dollars is being spent annually for research on cotton, compared to possibly as much as 10 million dollars on rayon, which is only a fraction as important quantitatively. The cotton industry, however, is taking steps to increase its research program so that it will not lose by default the battle for quality advantage. Although cotton is an age-old crop, the developments of the last few years in improved varieties of cotton, better testing methods, shrink-proofing, wrinkle-proofing, improved dyeing, flameproofing, waterproofing, and permanent starching, to name only a few, indicate that there are still no limits for productive, paying research on cotton.

A third factor has to do with some basic trends that affect textile markets. The population of the United States has increased by more than 15 million cotton consumers since 1940, and there has been a very substantial increase in the average standard of living. At present there is a strong trend toward greater use of lighter, more open, sports-type apparel, for which cotton is particularly adapted. The movement of the population of the United States toward the South and West, and the increasing amount of leisure time is adding momentum to this trend.

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Progressive Development of

(Continued from Page 13)

wright a great deal of trouble, they were not successful.

Since the time of the Greeks it had been known that steam could be made to move things. When water has been heated until it turns to steam it needs 1700 times more space than it occupied as water, and to get this space steam will push with unbelievable force against the walls that contain it. This force was set to work in the steam engine.

James Watt was a Scottish instrument-maker to whom a mine-owner had brought a broken pumping engine in 1753. As he worked with this machine Watt saw that it was not as efficient as it might be. He set himself to the task of making a better one. His first steam engine was a fearful thing that hissed, snorted, and finally blew to bits. Watt persisted, and by 1770 he had invented a steam engine that would really work. By the time Cartwright had invented the power loom, in 1785, the steam engine was ready to furnish the power needed to run it. The day of the loom run by man-power was gone forever.

Now that the new spinning and weaving machines were making cloth in an endless stream, there were not enough cloth printers to print the cloth. Cloth printing was still a slow job by hand. A Scotchman named Thomas Bell changed this when, in 1785, he invented a printing machine that consisted of a roller upon which the pattern was engraved. As this roller turned over and over, it printed an endless design upon a bolt of cloth passed through the machine, just as an automobile tire makes an endless print in a dusty road. With Bell's roller printer, hundreds of yards of cloth could be printed in one day.

Over in France the roller printer was adopted on a big scale by a manufacturer named Oberkomph. Cloth made in his factory at Jouy became so famous that the hard-working manufacturer grew rich and received many decorations, but he continued to open the factory doors in the morning and to oversee every bit of work that was done. Oberkomph had hundreds of designs engraved on his rollers. **Toil de Jouy** (cloth of Jouy) prints did not stop with floral designs: there were pictures of millers, reapers, hunters, sailors, American Indians, and scenes from literature and history.

Another French manufacturer, Joseph Marie Jacquard, of Lyon, invented a practical draw loom by means of which designs could be woven into cloth as it was made. Jacquard had seen sketches of the draw looms with which the Chinese wove their flowered silks, and he used much the same idea in his machine. His loom had an attachment that made it possible to lift any one warp thread at a time, by means of needles that reached down through holes in a band of paper. To make the loom produce a new design, it was only necessary to make a set of perforated cards. Jacquard looms were so successful that they are still used today, although other looms have been invented upon which designs can be woven.

Perhaps the most important thing about the Jacquard loom was that it released from the slavery of the old draw loom the children who, crouching behind it, had lifted and lowered the heddles as the weaver directed, to make the pattern on the cloth. Before he was ten years old Jacquard had been put to work at this job, and he knew how cruel it was.

(Continued on Page 19)

Bobbin and Beaker Editorial Page

THE BOBBIN AND BEAKER. Organized in November 1939 by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge twice during the school year by students of the Clemson College School of Textiles.

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Thank You

I wish to take this opportunity and space to express my appreciation to all of those who have made the 1949 Bobbin and Beaker a success.

It has been especially gratifying to be able to publish three excellent articles written by such distinguished men as T. L. W. Bailey, Jr., Norman E. Elsas, and Robert B. Evans. To these men who are so well qualified to inform us, we extend our sincerest thanks.

I also wish to thank my most able staff who cheerfully took on the added responsibility and work that was necessary for the publication of the Bobbin and Beaker. I am especially indebted to Bob Rice, Joe Clancy, Ed Broadwell, E. G. Sparks, and George Uldrick who were ready and willing to put in hard work and long hours when things were rushed.

To our advertisers, who make this publication possible, we send our humble appreciation and the hope that the Bobbin and Beaker has served you well.

We would also like to express appreciation to the personnel of Altman Printing Company of Anderson, S. C., for their patience, welcome advice, and valuable service that transformed each issue from a jumbled mass of printed matter into the finished product.

Editor

Joins Texize Chemicals

Texize Chemicals, Inc., announces the appointment of Carl M. Chalmers as a representative in the Textile Division. Mr. Chalmers will service Textile Mills in the Southeast. Before entering the armed services, Mr. Chalmers was associated with the Draper Corporation. On his return, he studied Textile Manufacturing at Clemson College. Mr. Chalmers' appointment is effective immediately. W. N Kline, Jr. is Sales Manager of the Textile Division and W. J. Greer is President of the firm.

Here Comes Dixie

The South, long thought of as a backward and unimportant section of this country is finally coming into its own. Many factors contribute to this rise in prominence, but dominating them all is the South's powerful and growing Textile Industry.

The textile industry in the Southern States is growing steadily. The South now holds greater promise for the future than at any other time in its history. Development has occurred in every phase of the industry. From the field to the distributor efficiency measures cotton manufacturing have been introduced through modernization of plants and machinery. Also special adaptation of cotton machinery has proven suitable for production of worsted and synthetic yarns. Surplus earnings have been put back into mill and machinery improvements and in the coming years when highly efficient production in a competitive market is the byword, the South will not be lacking.

Long considered America's economic "problem child", the South has now matured into a well balanced adult that might soon be pushing the "old folks" into the background. Perhaps it can't be considered a "Utopia" as yet, but it does offer fertile soil, abundance of raw materials, tremendous industry both diversified and growing, and a climate that tends to simplify the domestic problems of all. The South which has a territory which amounts to thirty-one percent of the nation's total area is populated with thirty-one percent of the country's people. The people of the South buy almost twenty-five percent of the country's garments through apparel retailers. Well over a billion dollars of wearing apparel was sold in the South last year.

The South, only a secondary textile producing center in 1900, has climbed in less than 50 years to a position of considerable importance, for Southern mills now produce more material than all the rest of the nation together. The movement of many of the wool, cotton, and rayon manufacturing concerns from New England to the Southern states account for much of the industrial growth, and unless there is a complete reversal of this trend, the South will soon produce all but a fraction of the nation's textiles. When production of the new rayon fiber began, its producers observed that Southern mills prospered because of natural advantages and decided that their best location was in the South close to large sources of wood pulp and cotton linters. The South now produces almost ninety percent of the rayon fiber made in the United States. It is booming in its production of the other manufactured fibers. More than half of all the yardage of all synthetic fibers is woven in the Southeastern States. The South is well entrenched in the fine and fancy goods market. While originally known for coarse constructions, the South is now showing the world that she can weave as fine goods as can be made elsewhere.

The South has proven that it is well into a period of social and industrial development which will astound the nation. The United States will now be forced to recognize the influence of the South on the well being of the entire country.

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(Continued from Page 17)

Now that the machine made cheap cloth, people could afford to buy more clothes than ever before. The only trouble was that sewing was still hard, slow hand work. It began to occur to a few tailors that there was nothing about pushing a needle in and out of a seam that a machine could not be made to do. But when, in 1830, a Frenchman named Thimonier showed a group of garment workers a machine for sewing, the workers were so angry that they broke his machine and threatened to do the same to the inventor if he made another one.

Over in America a young man named Elias Howe, who worked in a spinning factory, also invented a sewing machine. He invited five expert Boston tailors to a sewing match. When Howe with his sewing machine sewed five strips together before the tailors had finished half of their first strips, they were so far from pleased that Howe wisely decided to leave town at once. He tried to sell his idea in England, but, like almost every one of the inventors of the early textile machines, Howe found that his invention was copied, and it was many years before he received his due reward for it.

Once the idea was accepted that machines for spinning and weaving could be successful, there was no stopping the advance of the machines. Machines were invented that would knit, others that would make lace, embroider cloth, cut out patterns, and make cloth into garments. Spinning machines, looms, and cloth-printing machines were improved until at the present time there is little left for the human worker to do except to feed the raw fibers into one end of a row of machines and to remove finished cloth from the othe rend.

Textron Scholarship Announced

The School of Textiles of Clemson A & M College has been granted a Textron Scholarship to assist in covering school expenses, during the Senior year, of an outstanding Junior student of the School of Textiles, Dean Hugh M. Brown of Clemson has announced. The award of $500 for the 1949-'50 term will be made on Honors Day this year.

The Textron Scholarship is part of a plan concenved by Royal S. Little, President of Textron, Incorporated, to further the efforts of deserving Textile students. The winner is to be selected by the College on the basis of both high academic achievement and outstanding leadership qualifications for future application to the textile field.

Mr. Little believes that industry should assist talented young people, in order to help develop the tremendous human resources in this country for progress in all fields. In line with this objective the recipient of the Textron Scholarship will be perfectly free to choose his field of endeavor after graduation and is not obligated to the Textron Corporation in any way.

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Greenville, South Carolina

TEXTILE CHEMISTRY AWARD

A recent announcement from the headquarters of the American Association of Textile Chemists and Colorists has designated Mr. Joseph Lindsay, head of the Textile Chemistry Department at the Clemson School of Textiles, as Chairman of the Student Award Committee. This committee, which was set up originally at the suggestion of Mr. Lindsay, gives an award to the outstanding Textile Chemistry student at each Textile School that has a student chapter on the campus. The award this year will consist of paid Junior membership and a technical book which will be of immense aid to whoever reaches the goal as the outstanding Textile Chemistry student.

——BOBBIN AND BEAKER——

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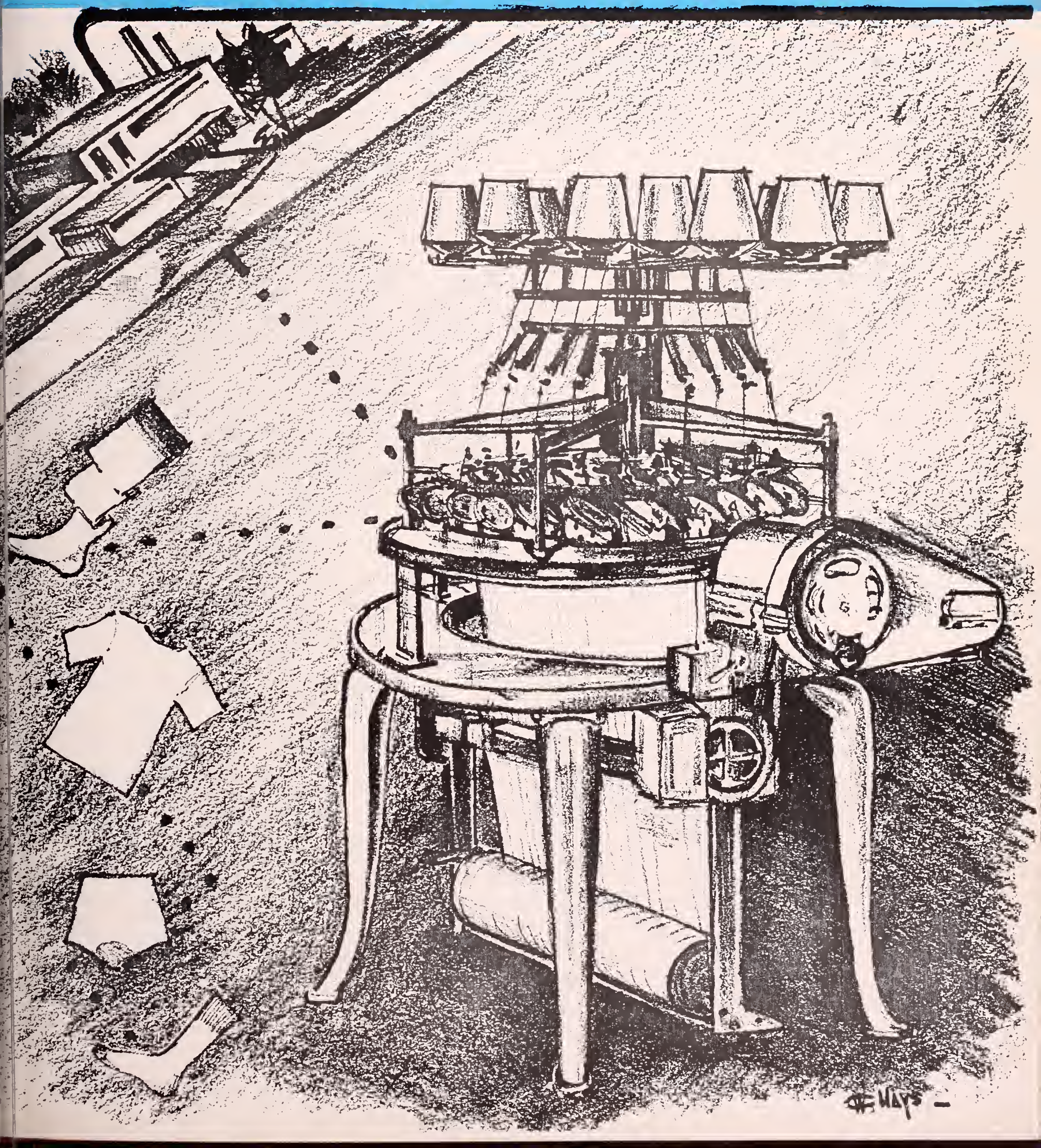
BOBBIN & BEAKER

STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

L. 8 FALL ISSUE, 1949 NO. 1



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GREENVILLE, S. C.

THE

BOBBIN and BEAKER

Official Student Publication
Clemson Textile School

VOL. 8 FALL ISSUE, 1949 NO. 1

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The Cover

This abstract drawing was done by William C. Mays, an Architectural senior at Clemson. It depicts the progress of the Textile School, which now offers for the first time a degree in knitting. It is interesting to note that the heavy black line traces the knitted articles from the mill to the machine to the finished product.

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THE BOBBIN AND BEAKER. Organized in November, 1939, by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge twice during the school year by students of the Clemson College School of Textiles. All Rights Reserved.

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POLICY—

The views and opinions expressed in all guest articles are those of the writers themselves, and must not be construed to necessarily represent the views and opinions of the Editors of this magazine or of the Faculty of the Clemson College School of Textiles.

THE BOBBIN AND BEAKER is a non-profit magazine organized to serve Clemson students and the textile industry. The publishing and circulation costs are financed entirely through proceeds received for advertisements. We ask our readers to favorably consider our advertisers when buying.

As The Editor Sees It

After many unforeseen delays, THE BOBBIN AND BEAKER is finally making its initial appearance of the 1949-1950 school year. A previously inexperienced staff is now much wiser and much better able to cope with problems of publishing such a magazine. It is our sincere desire to give you a greatly improved magazine in our Winter Issue which will make its appearance in the not too far future. In this issue we have instigated certain changes which we hope will boost the popularity of THE BOBBIN AND BEAKER.

To start at the very beginning, we have departed from past policies in the use of an original drawing as our cover. We think that Clayton Mays, who drew this cover, did an excellent piece of work.

Our guest editorial, written by Mr. Charles G. Johnson, Personnel Manager of the Judson Mills in Greenville, S. C., applies to all students who will graduate from college this year. It is also a word of warning as to what the graduate of today may expect to encounter when he makes his initial appearance in the business world. Mr. Johnson is exceptionally well qualified to write on this subject because he handles applications made by college textile graduates, and therefore knows just what is desired in these applications. His very interesting article may be found on page 4.

An article describing the Knitting Major which has been added to the Textile curriculum will be of interest to all students who desire to take such a major course. This article, along with the curriculum for Juniors and Seniors taking this major, can be found on page 6. We are indebted to Professor W. O. Allen for giving us invaluable aid in preparing this article.

As a new feature, we are presenting a textile quizz which is designed to further the knowledge of each textile student as to the history of the textile industry. Few of us have an opportunity to become acquainted with this phase of textile education since our training is primarily confined to the problems of the present day manufacturer.

The reader will note a generous increase in the amount of pictures and illustrations used in this issue which we hope will enhance the overall appearance of The Bobbin & Beaker. Also of interest is the new style type used throughout the issue. It is larger than that used in previous years and will add to the readibility of the magazine and its general appearance, too.

With this issue, we are initiating what we hope will become a permanent feature of the magazine in the column recognizing the activities of the alumni of the textile school. It is hoped that all former students of Clemson will make use of this column and advise Bobbin & Beaker on their various undertakings in the business world.

We wish to express our hearty thanks to Professor A. E. McKenna, our faculty advisor, for the excellent assistance he has given us in this trying period. He has served as critic, proof-reader, and father-confessor, as well as giving many valuable suggestions without which we would have been at a great loss. Our thanks also to the many other members of the faculty and those associated with the Textile School for their aid in the publishing of this issue.

It is hoped that all of our readers will feel free to offer any criticism which will improve this magazine in any way.

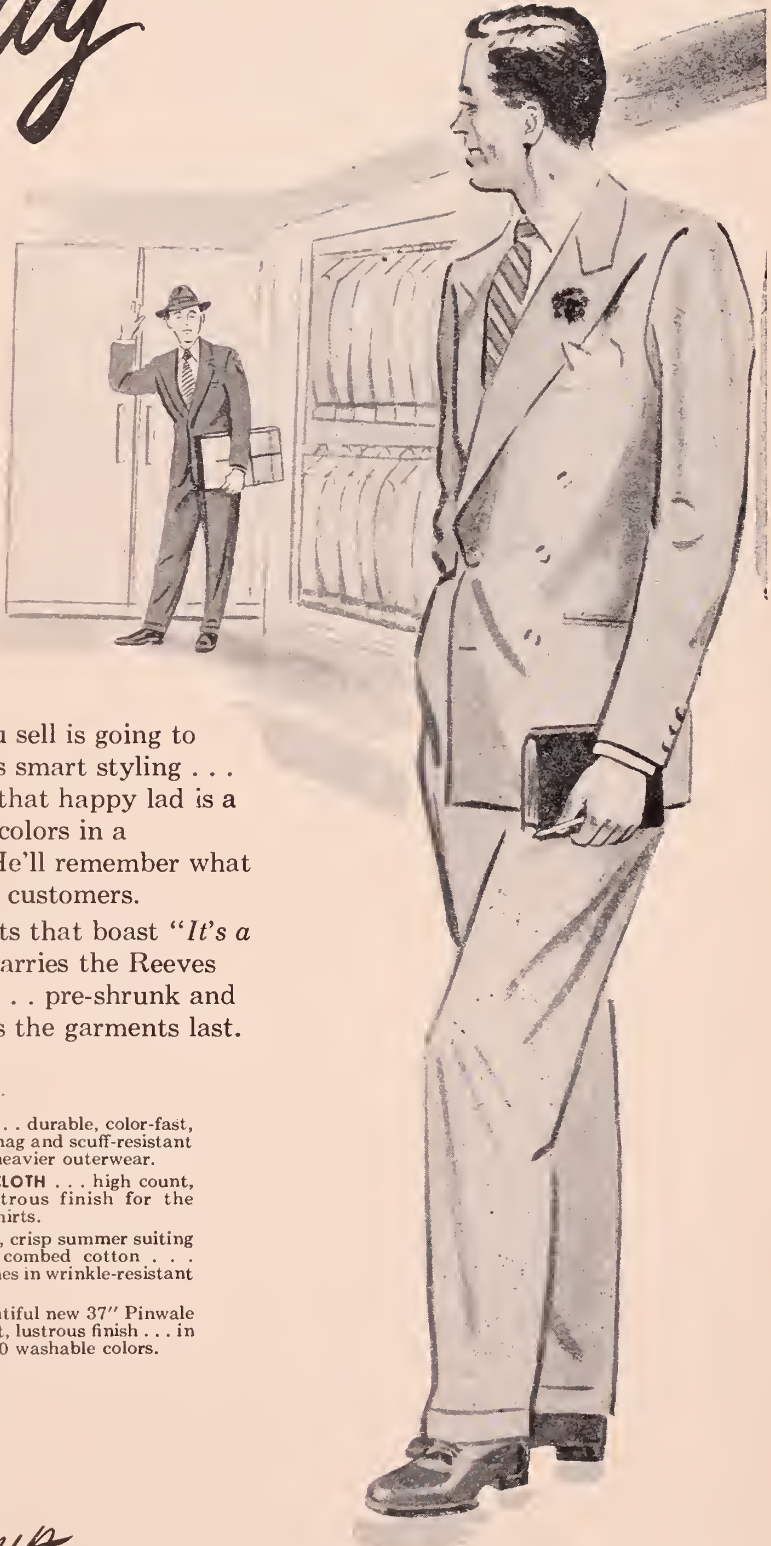
WHICH IS IT

Good Buy

OR

Goodbye

?



One way or the other, the label in any garment you sell is going to impress the consumer. If the garment he buys gives smart styling . . . comfort . . . long-wearing good looks—chances are that happy lad is a customer for keeps. BUT let him experience faded colors in a garment that only fits well *once* and it's goodbye. He'll remember what name *not* to buy. Don't risk making sales that lose customers.

Give the consumer the *value* he wants with garments that boast "*It's a Reeves Fabric.*" For you can be sure clothing that carries the Reeves label is made of the highest quality cotton fabrics . . . pre-shrunk and fast-dyed in colors which will stay bright as long as the garments last.

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GUEST EDITORIAL

Charles Gibbes Johnson is a native of Virginia, but is now a South Carolinian by adoption. Following graduation from Hampden-Sidney College in 1926 he took the Westinghouse Graduate Student course in Works Management and has been doing industrial engineering and personnel work for Westinghouse, DuPont, and the Deering-Milliken Mills ever since. His present position is that of Personnel Manager of the Judson Mills, Greenville, S. C.

Personnel Manager Tells Why You Should. . . .

Start Lining Up A Job Now

IN THE near future you will have to make a most important decision—what you are going to do and for whom you are going to do it. Conditions have changed from several years ago, and now you will be competing for jobs rather than many companies competing for your services. Adapt yourself to the times. The graduate who gets the job he desires with the preferred company will be the one who starts his campaign early.

First, you must decide the type of company you wish to join. Will it be a spinning mill, a weaving mill, a finishing plant, or a plant having all these processes? Are you interested in cotton, rayon, nylon, woolens, worsteds, or other fibers? You may ask for advice and guidance on this question, but the decision is yours. There are many companies processing the different types of fibers. All of them have certain advantages to offer. One may have modern equipment and pleasant working conditions. Another may offer low-cost housing, insurance, pensions and other benefits of this type. Geographical location might even be important to you. Certain companies will have more of the things you consider desirable than others. Find the company that has the greatest number of the things you want; investigate its reputation at home and in the trade; determine if it is on solid financial ground; make sure it has policies with which you agree—and then you are almost ready to proceed.

Before contacting your chosen company regarding a job, you should have some idea of the job you want now and, more important, the job you want ten years from now. It is much easier to work towards an objective than at random. Time spent on actual mill operations will be beneficial, whether you go in the line or staff organization. Don't expect too much too soon—the highest buildings require the strongest foundations. Should you prefer the line organization, you will eventually expect to rise to the su-

(Continued on Page 22)

If This Were Your Baby . . . . ..

How Would You Do It?

By JAMES R. ANDERSON, TM '50

IT SEEMS that each year when the staff of The Bobbin & Beaker assembles in its first conference, they look forlornly about them at their little brainchild, and then try to figure out just how they will possibly be able to secure enough copy and advertising to warrant the resurrection of this dignified and unofficial medium of the Textile School.

To those of us who have elected to do just that, the problem presents a stimulating challenge. There are details by the thousands which stare us in the face, and each one has to be taken under consideration separately. These include details in the selection of material which will make interesting reading matter for the most people, details in the letters sent out to the many advertisers who use the Bobbin & Beaker as one of their mediums, and details in the printing, proof-reading, makeup and layout of the entire issue. Finally, there are the details of circulation, auditing, and the many other things that go on in the late hours of the night so that the deadline can be met and the publication may be put to press.

The choice of topics is of prime importance in itself, for without a well-rounded and diversified plan for the selection of these articles, we would be at a total loss. And why? Well, it's really very simple upon analysis. With our present circulation in excess of 2000 copies, we find that we are trying to appeal to two different groups. More than half of that circulation is comprised of men in the textile industry; men who are faced with the problems of production, management, and selling; men, who, for the most part, are Clemson alumni. Our problem is to write something that will arouse their interest and command their attention.

On the other hand, almost 1000 copies are distributed right here on the campus to the undergraduates of the textile school. Consequently, we must select topics which will be read by the students, and from which they can gain information which will be of value to them. But, who among us would dare to venture an opinion on the varied and diversified interests of youth! What can we present that will be of interest to one group and not fall flat with the other? How, for instance, can we, as struggling neophytes, compile enough information on management to be able to advise both executive and student alike on the best policies to follow?

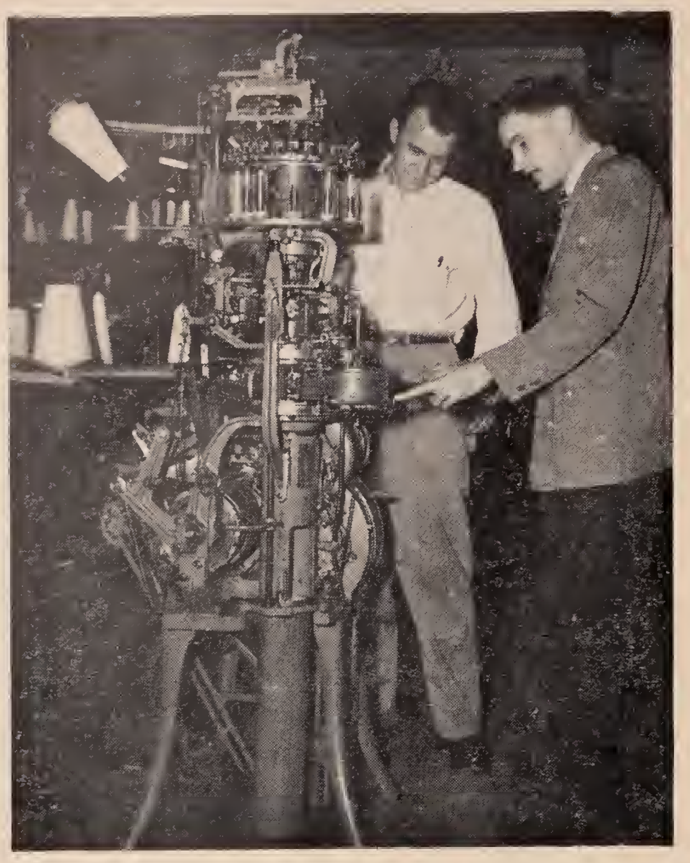
Actually, we believe our first objective is the duty to the students, and that is the most difficult one to carry out. We feel that the readers outside of the Textile School will find The Bobbin & Beaker to be a link between them and the school itself. They are eager to read of new courses offered, new members of the faculty, and developments in research. Our flambouyant student, replete with fancy cars, smart clothes, and with that gleam in his eye, on the other hand, will find this dry and uninteresting—unless we present it in a manner that will also appeal to him.

In the pursuit of this objective, then, we have assembled our first issue. It will be sent to readers in just about every state in the Union and several foreign countries. There is no question but what the magazine will carry the name of Clemson to the far corners of the earth, and will serve to help promote the Clemson man everywhere.

The potential value of this publication is practically unlimited. But, there are many points on which we have fallen short. We have ideas on what should be done as suggested above, but there are undoubtedly many other avenues down which we could travel and accomplish the same thing, and perhaps even better than in the past. In the final analysis, we are attempting to sell the Clemson student, through the Bobbin & Beaker, to the world—his world! The big question which remains in our mind is, simply, how would you do it?

Knitting Maj

Clemson Is Second S



The pattern mechanism of a model H. H. P. W. Scott and Williams circular hosiery machine is explained by Professor Allen. This machine is used in the manufacture of men's hosiery.

By N. A. HOWELL, T.E., '50

IF ANY of the old Clemson graduates took enough time out from watching the football game, dancing, and other activities during Homecoming week-end to wander through the Textile building, maybe they noticed the new signs of progress there. I am speaking mainly of the new Knitting laboratory.

While all the expected machinery has not yet been delivered and installed, there are numerous types of knitting machines to be found, and the new course is off to a good start.

At the present time, Professor W. O. Allen, a graduat of North Carolina State College, is teaching all knitting courses. The staff will be enlarged as the need arises.

With the addition of this new major in September, Clemson became one of the two schools in the nation to offer a degree in knitting. The growth and development of this expansion of the Textile School is sure to be watched with keen interest by all alumni of Clemson, as well as those engaged in the various divisions of the knitting industry.

Below are listed the courses to be followed by a knitting student in his Junior and Senior years. The Freshman and Sophomore years embrace the same subjects as those taken by the Textile Manufacturing student.

KNITTING MAJOR

1st Semester Junior

Soc. 301, Intro. Sociology	3	(3-0)
Engl. 301, Public Speaking	3	(3-0)
T. C. 301, Textile Chem.	2	(2-0)
T. C. 303, Textile Chem. Lab.	1	(0-3)
W. D. 309, Knitting	1	(0-3)
Y. M. 301, Roving Frames	3	(2-3)
M. S. 301, Military Drill	0	(0-3)
W. D. 311, Flat Knitting Mech.	2	(1-3)
Y. M. 305, Cotton Marketing	1	(0-3)
Approved Elective	3	
	—	
	19	

2nd Semester Junior

Econ. 312, Commercial Law	3	(3-0)
T. C. 302, Textile Chemistry	2	(2-0)
T. C. 304, Tex. Chem. Lab.	1	(0-3)
Y. M. 302, Spinning	3	(2-3)
Y. M. 306, Combing	2	(1-3)
M. S. 302, Military Drill	0	(0-3)
W. D. 310, Adv. Hos. Knitting	3	(2-3)
W. D. 312, Knit. Design & Anal.	2	(1-3)
Approved Elective	3	
	—	
	19	

1st Semester Senior

Econ. 401, Accounting	3	3-0)
T. C. 401, Chem. Proc. of Tex.	2	(2-0)
T. C. 403, Chem, Proc. of Textiles Lab.	1	(0-3)
T. M. 401, Textile Costing	5	(3-6)
T. M. 454, Time Study	3	(2-3)
M. S. 401, Military Drill	0	(0-3)
W. D. 411, Full Fashion Knit.	2	(1-3)
Approved Elective	3	
	—	
	20	

2nd Semester Senior

T. C. 402, Chem. Proc. of Tex.	2	(2-0)
T. C. 404, Chem. Proc. Tex. Lab.	1	(0-3)
T M. 403, Textile Management	3	(3-0)

Now Offered

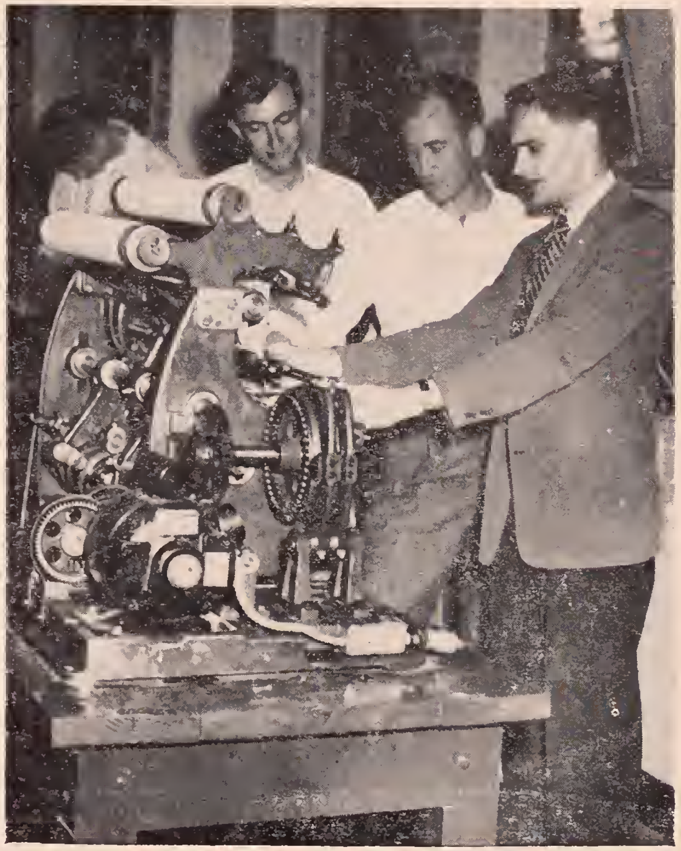
ation To Offer Degree

T. M. 462, Textile Microscopy	2	(1-3)
T. M. 464, Textile Testing	2	(1-3)
M. S. 402, Military Drill	0	(0-3)
W. D. 410, Body Wear Knit.	2	(1-3)
W. D. 412, Kn. Garment Mfg.	2	(1-3)
Approved Elective	6	
	—	
	20	

Among the courses in the above curriculum is "Advanced Hosiery Knitting." This course includes a study of circular hosiery machines, as well as the modern types of ribbers involved in the manufacture of the more complex types of hosiery. Another course named above is "Flat Knitting Mechanism", which deals mainly with the principles used in tricot warp knitters and the so-called knitting looms. Also are included studies of suitable yarns for the various types of knitting, as well as instruction on the preparation of knitting warps. "Knitted Design and Analysis", is a study of the pattern mechanisms of the more complicated ribbers. In the "Full Fashioned Knitting" course, the student studies the mechanics of full-fashioned knitting equipment. In this same course are studies of yarn preparation, inspection, finishing, packaging, costing, quality control, and design and analysis. "Circular Body Knitting" is a study of the machines used in the outerwear trades, along with the design and analysis of these fabrics. There is also a study of the market and of the knitting trade. "Knitted Garment Manufacture" includes actual experience in the manufacture of various knitted garments along with a study of the cutting trade and of fabricating machinery.

After completion of the required courses, each student should have a well-rounded background in every phase of the knitting industry. Too, the student will be well prepared to enter the field of knitting yarn manufacture, since he is required to take such courses as Opening and Picking, Carding, Roving and Drawing Frames, Combing, and Spinning.

Professor Allen has definite extra curricular activities planned for the Knitting majors which will prove of great value. He intends to place every Knitting student with a mill next summer, in order that he may gain experience as well as meet people in the industry. The students will also be taken on field trips in the surrounding area during the course of the school year.



The stitch formation of the Tricot Machine is demonstrated by Professor Allen. The Tricot machine produces extremely tight knit fabrics at a production rate much greater than that of ordinary looms.

The present equipment in the industry laboratory includes several plain hosiery machines, a new Komet Links and Links machine, a new H. H.-P. W. mens' machine, several Model K machines, several ribbers, a jersey circular body machine, a tricot machine, a Cidego machine, and several loopers. Soon to be added to these are, a new circular body knitting machine, the latest type of mens' hosiery knitting machine, a full-fashioned machine, and the latest type of boarding, seaming, and looping equipment.

When fully set up, the laboratory will be capable of producing mens' and children's hose, and both seamless and full-fashioned hosiery for women. In the laboratory will be made tricot goods, which can be used for slips, blouses, undergarments, and other womens' wearing apparel. Cidego goods for lace tablecloths, and curtains will also be manufactured. In addition to these, jersey and rib material for undershirts, T-shirts, shorts, gloves, and dish towels will be made. After having experience with these

(Continued on Page 21)

From A Senior To The Freshman Who Wonders

Shall We Set Our Standards?

By BERLYN K. SUTTON, TM '50

SHALL WE trouble ourselves with this ordeal of education? Studying is just a lot of nonsense anyway. What does it ever get us? My dubious readers, do not let yourselves fall victim to this fallacy of thought, because it will be a mistake which you will forever forget! From the very beginning of our four year grind to the victorious end, we must set and maintain our educational standards. No less important is the necessity of holding the highest moral measures possible.

There are numerous aspects from which we could view the value of education and setting of moral standards. We might be so prophetic as to discuss their bearing upon world salvation, but it is unnecessary that we think so deeply as this. While keeping in mind that the tangible rewards of learning are very important to all of us, we shall explore the source which must be gained and conquered in order that we might realize some compensation. Finally, we shall examine this education for the purpose of enabling an understanding of the intangible values which are unavoidably resultant.

It is true today more than ever before that the man with the education gets the choice position. This is naturally understandable since the supply of educated persons is constantly increasing. Thus, according to that unescapable law of supply and demand, the desirability of the uneducated must decrease. However, education in itself is not as influential as it has been. We must now be proficiently educated, and this is just what the employer in industry is requiring. It is evident then that we cannot rely upon that sheepskin alone. We must have more!

Do not think for one moment that these four years of toil are easy! They definitely art not! Only those with the courage to repel setbacks and the stamina to survive defeats will be seen walking down that aisle of victory some four years hence. The midnight oil in that symbolic lamp will be used and replenished multitudinous times. It shall be necessary to make numerous unpleasant sacrifices. There is an old saying which goes as follows: An ounce of preparation is worth a pound of cure. Likewise, an hour of sacrifice will bring a day of reward, a reward which at times will be very elusive, but which nevertheless will be eventualyl grasped.

The most important, and possibly least realized, assets gained from higher learning are those of thinking ability and power of concentration. These properties, along with the correct literary background, are the keys to success. They, however, are of no significant value unless mutually supported by one another. Thus, as we travel this four year journey, and it seems that no progress is being made, there actually is a great amount taking place.

The habits which we form during these influential years must receive very careful attention. We must resist all temptations which tend to lead us astray, for even though we may not realize it, our entire future life will fall into the mold which we form from it now. Consequently, the faults which we retain or acquire now will be carried through life with us. If we gain nothing more than principle, we will have achieved something great.

Now, we may ask if there is signifcant reward worth all this concern. Any number of authoritative sources may be consulted and they will all profess the same thing—the top is always open for the man who is just slightly better than the one presently there. Why can we not be the ones to fill that position? If we are to be, it is imperative that we begin preparation at once!

My friends, I ask you, "Shall we set our standards—now?".

DEAN BROWN ATTENDS EUROPEAN CONVENTION

Dr. Hugh M. Brown, Dean of the Clemson School of Textiles, left early in October bound for England, where the National Council of Textile School Deans will assemble in their semi-annual convention. Dr. Brown was elected president of this distinguished group at their meeting last spring.

During the three weeks visit in England, at which time the Deans will exchange and broaden their knowledge with representatives of the United Kingdom, they will be guests of the Cotton Board of Manchester and will attend the Harrogate meetings of British textile manufacturers.

The group will also be the weekend guests at Buxton of Sir Raymond Streat, Chairman of the Cotton Board. This conference will be attended by many British educators, manufacturers, and members of textile school faculties, and the occasion will provide the opportunity for an intimate exchange of information and opinion. A number of papers will be delivered by the British and American educators, the general purpose of which is to acquaint the textile school heads and instructors with the methods and principles employed in the several systems.

The group will complete their visit with a trip to the Manchester Machinery Exposition in Manchester, and then will see first hand the work of research organizations and schools in Leeds, Bradford, and other parts of England.

From there, about one half of the members will journey to the principal textile centers in France, Belgium, and possibly Switzerland, where they will study developments and methods of manufacture on the Continent.

The entire visit is the culmination of hopes and plans discussed in recent years by the Deans to make such a trip. Heretofore, the meetings have been held in various cities between New Orleans and Quebec, Canada, and have been aided by the interest and financial aid of the Textile Foundation.

Dean Brown's trip will be financed and sponsored jointly by the Sirrine Foundation and the Textile Foundation.

Textile Quiz

QUESTIONS

1. Who invented the power loom?
2. When was Textiles introduced into the Clemson curricula?
3. What is the Sulzer loom?
4. What kind of heddles are used to make Leno cloth?
5. Who invented the flying shuttle?
6. How has the cloth removing process on a loom been improved?
7. What new machine can spin direct from draw frame sliver?
8. What is the ideal temperature and humidity of the spinning room?
9. In what year was the modern card invented?
10. What wartime invention is especially designed for sizing nylon yarns during winding?

(Answers on Page 21)

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Looking Back Over The Years

The story of the founding of Psi, oldest
Greek letter fraternity at Clemson.

By **JAMES R. ANDERSON, TM, '50**

MOST of us who have grown up in the past two decades have quite naturally taken for granted many of the privileges and conveniences which surround us in every day life.

It is interesting to note that in the state of South Carolina it wasn't so many years ago that such common place organizations as Greek Letter Fraternities at state colleges were strictly prohibited. According to the Civil Code of the State in 1879, Article I of Chapter XXV states: "The governing Boards of all institutions of higher learning in South Carolina supported in whole or in part by public funds are required to forbid and disallow in their respective institutions secret Greek Letter fraternities or all organizations of a similar nature . . . ."

The history of the founding of Iota Chapter of Phi Psi, National Honorary Textile Fraternity, closely parallels the repeal of the above mentioned law and is thus of particular significance to members of Greek Letter organizations in all the state operated colleges in South Carolina.

In 1926, a group of textile students at Clemson, headed by William J. McKemie, banded together in an organization known as the Textile Club of Clemson College. Their purpose was a simple and motivating one—to help each other in their common ties, which were textiles. From such a group, they could meet in an atmosphere of mutual understanding and discuss the various problems that inevitably arise from time to time. In addition to that, they had the basic foundation from which they hoped to attain their ultimate objective, the formation of a Chapter of Phi Psi.

Clemson was at that time embarking on a period of growth and national recognition and the Textile School contributed no small amount to that reputation. It was thus both fitting and proper that a recognized organization such as Phi Psi should lend aid and assistance in the furtherance of that growth and in the perpetuation of the good name of the school.

McKemie began correspondence with Mr. A. E. Snyder, then President of the Grand Council of the National Fraternity, in the fall of 1926, and through him learned of the procedure necessary to gain membership. He suggested the formation of the aforementioned club, as the requirements to petition the Fraternity included a group consisting of at least five eligible men. Mr. Snyder also pointed out that it would be necessary to secure the approval of the President of the College and the Board of Trustees before any further action could be taken.

That is when they learned of the law of the state, which prohibited any secret Greek Letter organizations. Bill McKemie conferred with the late E. W. Sykes, former President of Clemson College, and learned that there was then a movement under way among the state colleges to repeal that law. McKemie and his group, together with the other participants, pushed this move to the fullest point, and after a considerable amount of talking, correspondence, and actions which could almost be considered as pure lobbying, a new bill was introduced to the State Legislature. On the 4th day of April, 1927, the Governor of South Carolina signed the bill, which read as follows:

> No. 126 An Act to repeal Section 2767, Code of Laws, 1811, Vol. III, Relating to Prohibiting Greek Letter Fraternities in State Institutions.
>
> Sec. 1. . . . that Section 2767 . . . Relating to Prohibiting Greek Letter Fraternities in State Institutions be and the same is hereby repealed.
>
> Sec. 2. All Acts or parts of Acts inconsistent with this Act are hereby repealed.
>
> Sec. 3. This Act shall take effect immediately upon its approval by the Governor.

A simple Act by the Legislature, we say, but one of profound importance. One can only imagine the far reaching effects of this repeal; an important departure from the reserved, sedate, and cautious measures of the day; an Act which reflects generously on the wisdom of the law-makers of the state.

Shortly after the repeal was passed, President Sykes called McKemie into his office to present him with the good news, and the announcement was subsequently made to the entire student body. Professor Dan Thomson, one of the original men in the Textile Club, recalls the tremendous amount of cheers and merriment with which the students reacted to

(Continued on Page 20)

Worsted Spinning System Uses New Drafting Assembly

Editor's Note: This article appeared in the October 1949 issue of "The Textile World". I wish to thank the editor for granting "The Bobbin and Beaker" permission to reprint it and the accompanying diagrams.

A new five-step method for producing worsted yarn from top has been developed by Saco-Lowell Shops, 60 Batterymarch St., Boston, Mass. The system eliminates use of conventional cans, cap bars, and nebs, and introduces a new ball creel and drafting assembly.

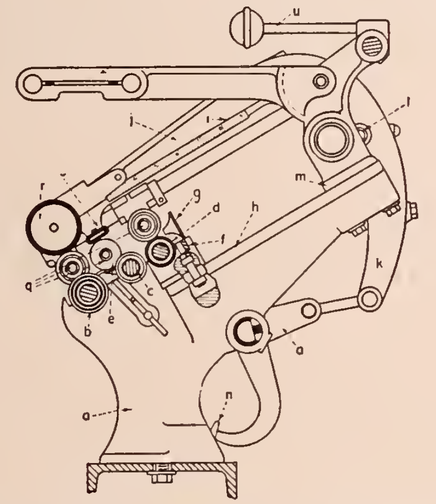
Two methods of processing are available. For wools up to 6 in. in length, a pin drafter (or similar gilling unit) is used, followed by two passages of 3-over-4 drawing, a single passage or roving (or possibly two), and spinning. For wools over 6 in., three passages through the pin drafter (or similar gilling unit) are recommended, followed by roving and spinning. In this latter method, drawing is eliminated.

Pin drafters and drawing frames deliver to balling heads instead of to cans. At the second gilling operation, ball creels, closely coordinated with the receiving unit, deliver stock under even tension and at a controlled rate which can be easily adjusted.

The Model DS drawing frame is used as the final pre-roving operation for wool stocks with fiber length under 6 in. The frame can be used in two stages, breaker and finisher, always followed by a pin drafter or similar gilling equipment. Objectives of the drawing process are to secure doublings, to complete blending, to attain parallelization of fibers by drafting under effective control, and to produce a sliver suitable for efficient drafting at the roving frame.

As slivers emerge from the front roll of the drawing frame, they come in contact with a static bar which neutralizes any charge developed during drafting. The web then enters a new upper trumpet. This upper trumpet is connected with the stop mo-

(Continued on Page 21)



Built-In Flexibility Features New Drafting System

a	ROLL STAND *a* is made of die-cast metal and is designed to withstand severe loading by pressure on top rolls.
b,c,d,e	BOTTOM ROLLS *b,c,d,* are made of case-hardened steel with special fluting and are mounted in antifriction bearings with sealed-in lubricant. Spacing of first and second bottom rolls and apron bar e is not adjustable. Second bottom roll c is constructed to obtain a broad and yielding control over fibers. Fibers passing through the zone are relieved of any definite bite, although inter-fiber friction is retained, causing a smoothing and grooming of the fibers.
f,g,h	BACK BOTTOM ROLL *d,* together with traverse bar *f,* and roving guide *g* are adjustable along splineway *h* which allows regulation of spread of rolls.
i,j	BUILT-IN GAGE *i,* permanently fixed to upper arm *j,* permits exact setting of rolls, eliminates use of leaf gages. Horizontal portion of upper arm *j* replaces cap bar and nebs.
k,l,m	ARM *k* is built in form of bell crank pivoted at pin *l* which is supported on the roll stand by bearing piece *m.* Vertical section of bell crank is hollow and contains a strong, calibrated spring which creates pressure on the top rolls. Pressure on front and back rolls combined is adjustable from 40 to 200 lb. A gage permits setting pressure to definite and uniform degree. The pressure, once set, is said not to change even when rolls are removed and replaced.
n,o	HANDLE *n* attached to bell crank o permits relieving of pressure on spring quickly and easily.
q	TOP ROLLS *q* are mounted in antifriction bearings supported by arbors attached to horizontal arm. Arbor for third line of top rolls is movable.
r,s	TWO CLEARERS, a revolving plush roll *r* and a small flat clearer s, make up the clearer system.
t	FLYER SUPPORT t is used to place flyers on during doffing of the roving frame. When not in use, support can be moved to vertical position.
u	NEW SHIPPER ROD *u* is easily accessible and easily cleaned. Design of the rod permits precise jogging of the frame.

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Nation's Textile Instructors

Clemson Faculty Well Represented At Lowell, Massachusetts Conclave

by H. E. Bright, '50

LOWELL Textile Institute, of Lowell, Massachusetts, was host last June to the inaugural assembly of the Textile School Staff Conference, which met there in a four day session. Present were delegates from seven prominent textile schools including Clemson, North Carolina State College, Philadelphia Textile Institute, Rhode Island School of Design, Lowell Textile Institute, New Bedford Textile School, and Bradford-Durfee Textile School.

More than twenty members of the Clemson Textile School were in attendance at the meeting, which represented the largest single delegation of any of the participating schools. The Clemson educators traveled by commercial airline both ways.

This conference, the first of its type ever held, provided the occasion for many distinguished m in the textile industry and textile education to sp to the group on topics which imparted their vi points and suggestions on education in the vari textile schools. Of great interest was the disc sion given by three men entitled, "A Reaction Textile School Education and the Problem of P ing Men in Supervisory Positions." These spe ers were Mr. Frank Maria of the Merrimac Ma facturing Company, and Mr. James J. Gaffney the Newmarket Manufacturing Company, both Lowell, and Mr. Wallace McQuarrie of the Ab Worsted Company, Forge Village, Massachuse An attentive audience listened to many thought voking ideas presented to the convention by th representative leaders, and their suggestions undoubtedly have some influence on solving textile education problems in the future. One th of importance which these speakers stressed was great need for persons gifted in public relations leadership. Professor Edward R. Schmarz, of M

ge Knowledge At Convention

chusetts Institute of Technology, presented a val-
ble lecture entitled, "The Type of Training Prere-
isite to Research and Graduate School Training
d the Contribution of Textile Education at the
dergraduate Level". He related the various types
research into which one might enter, and pointed
t that few people are adaptable to the field of re-
rch, for one reason or another.

At other sessions held in the mornings, the dele-
es themselves were permitted to discuss and
npare the different methods and techniques em-
yed by the various schools in textiles on the col-
e level.

Afternoon meetings consisted primarily of forum
ups or panel discussions in which the different
partment members met. Here, the groups were
ken down into their special fields, wherein the
jects such as weaving and designing, yarn man-
cture, and textile chemistry were discussed and
npared at great length. Different teaching pro-
ures and ideas were brought into the open, and
many outstanding differences were disclosed. Through the exchange of ideas in these discussions, many worthwhile instruments of improvement were no doubt acquired.

It is to be gathered that the main purpose of this conference was to bring the textile educators together in order that they might discuss pro and con the various types of education. From this it will be possible to utilize the valuable points of the present educational systems, and delete those which can be improved upon in some way. Consequently, the textile employer can look forward to a more desirable prospect for filling his needs.

Members of the Clemson faculty attending were: The Dean, Dr. Hugh M. Brown, W. O. Allen, E. B. Berry, T. A. Campbell, R. G. Carson, W H. Fricks, G. S. Graham, T. A. Hendricks, R. C. Hendrix, J. C. Berry, T. A. Campbell, R. G. Carson, W. H. Fricks, G. J. L. Richardson, D. P. Thompson, J. V. Walters, W. C. Whitten, W. B. Williams, H. B. Wilson and C. V. Wray.

American Society Of Textile Engineers

DUE TO the increasing technicalities involved in the operation and maintenance of the modern textile plant, it was deemed necessary several years ago to install a new curriculum whereby the students could receive the technical and engineering training necessary to meet the demands of the textile industry. For the benefit of these students, a professional organization known as the AMERICAN SOCIETY OF TEXTILE ENGINEERS, was organized at Clemson last year, a society devoted to the advancement of engineering in the textile field.

The A. S. T. E., as it is known, has begun the Fall semester with a vigorous program of professional activities. One of the most important of these activities is the operation of an Alumni Bureau. This Alumni Bureau was a recognized necessity due to the fact that many jobs become open to graduates with experience in their given field. However, no way had been devised by which the Textile office could know of the graduate's location and the type of work in which he has had experience. The Bureau is designed to overcome this difficulty. Letters have been written to the industry advising them of the activities of the A. S. T. E. Other textile schools have been invited to set up affiliated chapters.

Nine new members have joined the organization, bringing the membership to well over fifty. They are: R. G. Smith, J. R. Dawkins, J. G. Williamson, H. P. Worth, H. M. Cooper, J. R. Stewart, C. F. Williams, Gaston Gage, Jr., and W. T. Cochran. Officers of the organization are D. M. Garren, President; R. W. Crouch, Vice-President; H. F. Magill, Secretary; D. C. Shirley, Treasurer; and H. C. Wingard, Critic and Parliamentarian. The two faculty advisers are Professors Shigley, and Gaston Gage, Sr.

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Where Are They Now?

By GEORGE ASNIP, JR., '50

WHILE talking to Professors Gage and Thomson the other day, in an attempt to find out where I might be able to obtain information on the whereabouts of some of the men who have graduated from Clemson and gone on into the textile world, the old memories of their fellow students and classmates were recollected. Professor Gage, graduate of the Clemson class of 1921 started speaking, "Well, there's Bennett Rose who is now the Vice-President and General Manager of the Woodside Cotton Mills in Greenville, S. C.; W. J. Erwin, of the class of '21, is the Vice-President and General Manager of the Ware Shoals Manufacturing Co.; "Smokey" Edwards, of the class of '33, is General Manager of the Abbeville Mills; and then there's J. C. Crawford, of the class of '11, who is Director of Research in Yarn Manufacturing for J. P. Stevens & Co., in Great Falls, S. C."

Now, Professor Thomson, graduate in the class of 27, took over for awhile. "Bill McKemie, the organizer of the Clemson Chapter of Phi Psi, is with the Avondale Mills; Mike Link is the Superintendent at Hogansville; Rudy Harrington is the Vice-President of the same mill."

Professor Gage once more joined in the conversation. "John Wigington is director of the government laboratory at Clemson. J. Murphy Cook is head of the Government Spinning Laboratory at Clemson, and "Sandy" Campbell is Dean of the Textile School at North Carolina State College. J. M. Barnwell, of the class of '02, is the retired Secretary of the Aragon-Baldwin plant of the J. P. Stevens Co."

There are many graduates who have remained on the campus or who have returned to us to impart of their great knowledge to future generations of Clemson textile men. Some of these are T. A. Campbell, class of '28; E. F. Cartee, class of '25; J. C. Edwards, class of '42; Gaston Gage, class of '21; J. S. Graham, class of '42; T. A. Hendricks, class of '37; R. C. Hendrix, class of '48; L. H. Jameson, class of '42; E. A. LaRoche, of the class of '42; A. E. McKenna, class of '30; W. E. Tarrant, class of '27; D. P. Thomson, class of '27; J. V. Walters, class of '33; Bratton Williams, class of '25; and H. B. Wilson, class of '41; and C. V. Wray, class of '40.

We would like to make this column a permanent feature of the "Bobbin and Beaker" and would greatly appreciate it if all Clemson textile graduates would give us information on his present status. Due to the fact that our present records are out of date we would like to have the present address and occupation, date of graduation, and any other information that would be applicable. Please just drop a card to Box 552, Clemson, S. C.

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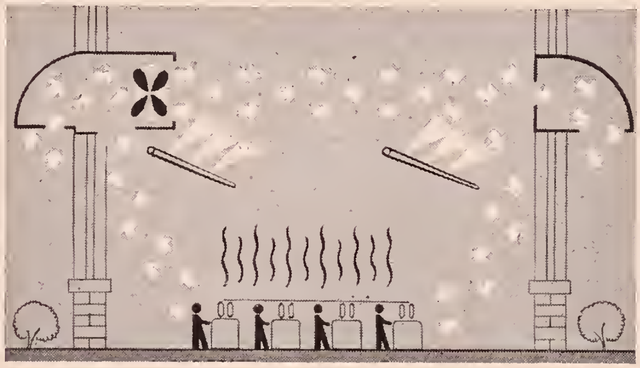

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PHI PSI

Pictured here are 17 of the new "Worms" who recently joined Phi Psi fraternity. They are: Back row: C. T. Price, Ninety Six, S. C., J. M. Farmer, Anderson, S. C., R. B. McKinney, Pickens, S. C., R. E. Lark, Greenville, S. C., W. M. Poag, Joanna, S. C., R. D. Ballenger, Charlotte, N. C., I. S. Williams, Anderson, S. C., D. I. Brett, New York, J. R. Verner, Buffalo, S. C. Front row: W. M. Kirby, Laurens, S. C., A. H. Lowe, Warrenville, G. P. Gassaway, Jefferson, Ga., J. W. Gaillard, Walhalla, S. C., M. G. Michael, Salisbury, N. C., I. D. Hopper, Chester, S. C., C. E. Huff, Woodruff ,S. C., J. L. Neal, Fort Mill, S. C. Not shown is R. N. Van Ham of Auburn , Maine.

PHI Psi at Clemson is happy to announce the pledging of 18 new men for membership in the Fraternity.

One of the highlights of last year's activities of Phi Psi was the 46th Annual Convention held at the Atlanta Biltmore Hotel, Atlanta, Ga., on May 6, 7, and 8th. Of particular significance and importance was the election of Mr. M. Earl Heard as the new Grand President of the Fraternity. Mr. Heard, a graduate of Kappa Chapter at Alabama Polytechnical Institute, Auburn, Alabama, was formerly Dean of the Philadelphia Textile Institute, and also Dean of the Texas Technological College at Lubbock, Texas. He is now Vice-President of the West Point Manufacturing Company in charge of Research and Development for all the mills of the organization.

Professor James B. Giblin, of the New Bedford Technical Institute was elected Vice-President of the Grand Council. The term of office for both men expires in 1951.

Representing Clemson at the convention were active delegates Floyd Griffin, Jr., and James R. Anderson. Many other members of the chapter were in attendance the last two days.

In the annual Chapter elections held last Spring, James R. Anderson was elected to the office of President. Anderson is a Textile Manufacturing senior from Elmhurst, Illinois. Roy F. Barrett, of Simpsonville, S. C., was elected Vice President. Other officers for the new year include B. R. Adams of Anderson, S. C., as Secretary-Treasurer; B. K. Sutton of Greenville, S. C., as Senior Warden, and H. E. Bright, Greenville, S. C., as Junior Warden.

Plans are now under way in the chapter for the work which will be exhibited at next year's annual convention. As of the time this issue goes to press, the location of the convention remains unannounced.

Highlights of Homecoming

by M. M. Clinkscales, Jr., '50

ONCE again Clemson College has proved itself a most gracious and entertaining host, for the end of the 1949 Homecoming saw approximately 30,000 friends, students and alumni of Clemson leave the campus after having been well entertained and feted. Many varied activities on the campus contributed to the festivities as cadets adorned themselves with freshly pressed uniforms and veteran students added neckties to their customary attire. Numerous lovely damsels added color and background as they were paraded over the campus by their escorts.

Most of the activities centered around the gridiron classic at Clemson's Memorial Stadium Saturday afternoon where a capacity crowd of approximately 20,000 witnessed the thrills and spills as Clemson was defeated by powerful Boston College 40 to 27. During the half the spectators were entertained by Clemson's nationally acclaimed crack Senior Platoon and the Clemson band.

The lovers of night life had a field day during the weekend as parties and dances became the order of the day. Dean Hudson and his orchestra furnished the music for the formal dance Friday night and the informal dance on Saturday night. At the formal dance Friday night seven lovely young ladies were selected as beauties for the 1950 Taps. Many intermission parties were held in club rooms over the campus by the different clubs and fraternities.

Friday afternoon Clemson's corps of cadets made an impressive display in a regimental parade on Bowman Field before a large number of spectators. The parade was given in honor of Clemson Alumni, and was reviewed by distinguished guests, among whom was Miss Barrie Jean Wingard, Miss South Carolina of 1949. On Saturday most of Clemson's schools held open house for visiting alumni and their families.

Clemson's chapter of Phi Psi, national honorary textile fraternity, held open house after the football game Saturday for alumni and for student members of Phi Psi and their friends. Some 100 persons enjoyed good fellowship in the Phi Psi Club Room as coffee, sandwiches, and cakes were served.

Not all was play on the campus, however, as two very important groups held meetings in the Textile Building. The Sirrine Foundation held a meeting as did the South Carolina Division of the Southern Textile Association. The members of the South Carolina Division of the Southern Textile Association convened in the Textile Auditorium Saturday at ten o'clock in the morning for their fall meeting. Some two hundred persons heard an address by Mr. Thomas L. Carroll, assistant to the executive vice-president of the National Cotton Council, and Mr. C. W. Bendigo, Editor-in-Chief of "Textile World." After topics of interest had been discussed and the meeting had been adjourned, lunch was served to the members of the association.

All day Sunday visitors could be seen looking over Clemson's picturesque campus and the many points of historical interest. The barracks area was very gaily decorated for the weekend with the school colors, posters and cartoons.

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Instructors Added To Textile School

T. H. Guion

Assistant Professor of Textile Chemistry and Dyeing

New Bern, N. C., is the home of Mr. T. H. Guion. After receiving his B. S. Degree in Chemistry from Davidson in 1940, he began his graduate work at Johns Hopkins University and later at the University of North Carolina. In 1942, he entered the Chemical Warfare branch of the U. S. Army, and upon his discharge, returned to his studies at Carolina, where he subsequently received his Ph.D. in chemistry. He is a member of Alpha Chi Sigma fraternity.

Louis A. Carson

Instructor in Weaving

Mr. Carson is a native of Orangeburg, S. C., where he graduated from high school in 1943. After one year of work at Clemson, he entered the U. S. Navy, which claimed the next 27 months of his life. Carson returned to Clemson in 1946 and received his B. S. Degree in Textile Manufacturing in 1949. At the present time, he is teaching in the Weaving and Designing department.

B. E. Taylor

Instructor in Weaving and Designing

Mr. Taylor, a native of Greer, S. C., is presently instructing in the Weaving and Designing department here. He is a member of the class of 1949, and is one of the most recent Clemson graduates who has taken up the teaching profession. After completion of high school, he entered the Army, serving in the Coast Artillery, Infantry, and the Signal Corps. Upon discharge, he entered Clemson, where he was a member of Phi Psi.

R. F. Jenkins

Instructor in Textile Chemistry and Dyeing

Also among the new personalities in the textile department is Mr. R. F. Jenkins, a native of Charleston, South Carolina. Upon completion of high school, he entered the U. S. Air Force for a three year period. A graduate of The Citadel, Mr. Jenkins was a member of the Knox Chemical Society and the A. C. S. While he is teaching at Clemson, he is also engaged in graduate work. Mr. Jenkins is married and has one child.

W. O. Allen

Instructor in Knitting

A native of Canton, N. C., and a graduate of the Canton High School, Mr. Allen is among the new professors who have recently joined the Clemson Textile School staff. He finished North Carolina State College in 1949, where he received his B. S. Degree in Textiles, and is now teaching courses in knitting, Clemson's newest textile course. While at N. C. State, Allen did work in student teaching, and spent this past summer visiting and studying in cotton mills. He spent the war years with the U. S. Navy under their V-5 training program.

C. B. Gambrell

Graduate Assistant in Textile Chemistry and Dyeing

Among the new instructors is Mr. C. B. Gambrell from Birmingham, Alabama, having completed his high school education. He entered the University of Alabama. Shortly afterward he enlisted in the Combat Engineers, and served therein for the next thirty-eight months. Later he took a nine months course in engineering at Yale under the auspices of A. S. T. P. In June of 1947 he entered Clemson where he received a Bachelor of Science Degree in Textile Engineering. He was a member of A. S. T. E. and A. S. M. E. while a student at Clemson

C. V. Wray

Assistant Professor in Textiles

Another newcomer to the textile faculty is C. V. Wray. After attending school in his home town of Elberton, Ga., he entered Clemson in 1936 where he completed his work in Textile Engineering in 1940. While a student at Clemson, Mr. Wray was Editor of the 1940 edition of Taps, a member of Blue Key, Phi Psi, The Tiger Brotherhood, Alpha Chi Psi, and the Senior Platoon. During the war, he served with the Quartermaster General Office in Washington for two and one-half years, and two years more overseas. Since his discharge in 1945, he has worked for the Dan River Mills and later for the Georgia Duck and Cordage Mills, where he was Mill Superintendent for two years. He is now teaching courses in costing and management.

J. W. Hawkins

Graduate Assistant in Textile Chemistry and Dyeing

Mr. Hawkins was born in North Charleston, South Carolina, and is a graduate of the high school of that city. In 1949, he received his B. S. Degree in Chemistry from the College of Charleston, where he was a member of Phi Delta Kappa. Mr. Hawkins spent his summer months as a laboratory technician for the Raybestos Manhattan Company, Inc. While teaching at Clemson, Mr. Hawkins is doing work on his master's degree.

(Continued on Page 22)

Looking Back Over the Years

(Continued from Page 10)

the news, as it was this occasion that gave birth to several other Clemson organizations.

The Textile Club lost no time in going ahead with their plans. They secured the approval of the college for the fraternity, and on May 16th, 1927, the installation ceremonies took place at the Poinsett Hotel in Greenville, South Carolina. Mr. A. R. Thompson, Vice-President of the Grand Council, acted as the Installing Officer with the assistance of members of Eta Chapter from North Carolina State College at Raleigh. The Charter of Iota Chapter lists 11 men as the original members. They are: C. S. Doggett, W. J. McKemie, P. H. Miller, T. W. Kitchen, D. P. Thomson, D. A. Gibson, C. H. Chreitzberg, R. T. Stutts, J. L. Bell, A. C. Link, and R. C. Harrington.

Thus it was that Phi Psi, founded by five students of the Philadelphia Textile School on March 18th, 1903, became the first Greek Letter Fraternity of its type to be represented at Clemson. Its activities have been, from the time of its birth to the present day, purely along the lines of a professional organization, without competing in any way with the so-called social fraternities.

The essential ideals of the fraternity are high, and eligibility for membership rigid. Heavy emphasis is placed on scholarship and high standing among the members. Phi Psi recognizes the necessity and the wisdom of work properly done, and also appreciates the rewards of constant application and honest endeavor. It is the aim of the organization to give a little more to its members than just book-learning while in school. It is a form of recognition for the fine qualities that a man develops in college which will be an even greater challenge to him in the years which will follow. That is not alone in scholarship, but in each branch of the school's activities, and above all, high standing as men.

Today, with more than 3000 members, Phi Psi is the largest and most respected Textile Fraternity in the world. With graduates coming from the nine chapters located in eight states in the South, Southwest, and East, many of its alumni hold some of the highest positions of trust and respect in all the vast textile industry. It remains today, as it did many years ago, a goal for which all students may well aspire. Its reputation and dignity have only been enhanced in the years of its growth.

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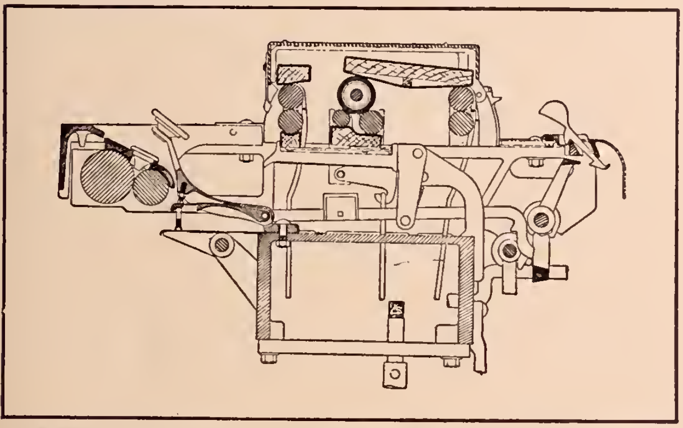
Worsted Spinning System Uses New Drafting Assembly

Continued from Page 11)

tion and prepares the sliver for entrance into the lower trumpet which completes condensation of the sliver. From the calender roll, stock passes to the balling head.

An entirely new drafting assembly, Type 4, is used on the roving and spinning frames. The Type 4 unit is designed for maximum flexibility. With a simple adjustment, rolls can be set to operate efficiently within the full range of commercial wools, the company states. The system is also so designed to eliminate cap bars and nebs, and to be spring weighted. Details of the system are shown in the panel.



***DS DRAFTING SYSTEM** is used in drawing frame equipped with balling head. Large middle top roll rests on third bottom roll but is separated by only 0.03 in. from smooth-surfaced second roll. Exceptional fiber control is said to result. Note two condensing trumpets.*

While roll settings are not overly critical with the Type 4 drafting assembly, adjustment of rolls is important. One of the best settings so far discovered is a spread between front and back roll slightly less than the longest staple in the stock. As a result of the strong roll pressure possible, drafting is said to be accomplished so that a more even distribution of fibers in the strand results, as well as a more even yarn.

Knitting Major is Now Offered

(Continued from Page 7)

various machines, the graduate will have knowledge of practically every problem which he will face once he enters the knitting industry.

At the present time, the opportunities for Knitting graduates are very significant. Here is a somewhat exclusive field into which one may enter. This is partly due to the fact that there has been a large increase in the use of knitted goods in every field of clothing. In addition to this, there is a lack of college-trained men with a background in knitting. Because of the relatively large number of mills in proportion to the number of graduates, jobs should be somewhat easier to obtain so long as these conditions prevail.

In addition to the jobs connected with the actual manufacture of knitted goods, positions may be obtained in selling, buying, management, advertising, and research. Also, there are openings with large companies making knitting yarns, and machinery.

For many years, we in the South were thought of as a more or less unimportant portion of the population. However, that outlook is a thing of the past, and it is now an accepted fact that many industries are moving southward. In fact, the South has climbed from a position of secondary textile importance which it held in 1900, until it now holds the top position. This is particularly true of the weaving, spinning, and finishing divisions of the textile industry. However, only in the last few years has the knitting industry began its southward movement. While the knitting trade is by no means a new development in the South, it is most certainly a growing one, and the knitting graduate of today can certainly look forward to taking his proper place in industry.

By constantly keeping in touch with the mills, and having equipment on hand which will be the equivalent of that in the modern knitting mill, the Textile School will be a great benefit to all phases of the textile industry.

ANSWERS

(To Textile Quiz—Page 9)

1. E. Cartwright
2. September 1898
3. A Swiss invention which does away with the regular shuttles.
4. Doup heddles
5. John Kay
6. The cloth is pulled through a slot in the weave room floor to the cloth room below.
7. The "Nastrofil" machine invented in Italy.
8. Temperature 75 to 80.
   Humidity 50% to 60%.
9. 1830
10. The "No. 250 Leesonia" sizing machine, manufactured by Universal Winding Co., Manchester, England.

Start Lining Up a Job Now

(Continued from Page 4)

pervisory ranks, where by properly directing the efforts of others you will help produce the finished product. In the staff organization you may choose between industrial engineering, personnel, laboratory, production control, quality control and others. Don't be afraid to make sacrifices today to enhance your opportunities in the future. Do have your objective and direct your efforts towards attaining it.

Now you are ready to make your approach. First, find out whom you should contact in the companies of your choice—companies rather than company, because it pays to have more than one iron in the fire. Write a letter and ask for an appointment at his convenience. In your letter you may give pertinent information regarding your personal background, your education and your experience. Make your letter factual and concise. It doesn't do to brag, but you certainly don't want to be too modest about your accomplishments.

When you appear for your appointment, be sure you are on time. The man you see will be a busy man and his day, as yours, contains only twenty-four hours. Remember you are trying to sell something quite important—yourself. How you dress, how you shake hands, how you talk, what you say, how you act, your reaction to questions, and numerous other things will help your interviewer form an opinion of you. Don't linger. The person you are visiting will indicate when the interview is over. That is not a signal for you to discuss the price of eggs in China. Thank him for the opportunity of talking with him and leave. It is perfectly all right to ask when you may expect an answer one way or another. No reputable concern wants to keep you in suspense and interfere with your looking for another opening, if they have none available. Don't be afraid to follow up your leads if they are at all encouraging. You don't want to "pester" anyone, but a certain amount of persistence will pay. All companies will have a great number of applicants and, all other things being equal, the persistent applicant will receive more attention.

When you are fortunate enough to get a job, put your whole heart and soul in it, though it may be sweeping floors on the third shift. Other jobs on other shifts will be open some day. Do just a little bit more than you are expected to do. That is one way of getting a pat on the back for a job well done and one way of helping pull yourself a rung or two up the ladder. Think of reasons why you can do the job and of ways and means to do it better, instead of reasons why you can't do it. Realize that, although the fellow next to you may not have had all your advantages, he can teach you a lot about your job. He can prove a strong ally if he is on your side.

The way you do your job and the way you impress your supervisors and fellow workers will mold your future. A company may offer you an opportunity, but what happens from there on depends on you. There will always be more good jobs open than there are good men to fill them. Be an optimist who finds opportunity at every difficulty and not a pessimist who finds difficulty at every opportunity.

William Sproule

Research,
Substitute

Mr. Sproule, who hails from Havorford, Pennsylvania, graduated from high school there in the year 1939. He then entered Philadelphia Textile Institute where he was on the varsity basketball team. He served as president of the Phi Psi chapter there in the year 1943. Upon receiving his Bachelor of Science Degree in Textile Engineering, he entered the Navy for the following thirty months. Afterward, he returned to Philadelphia Textile Institute where he taught fabric analysis and weave formation for two years. Immediately following this period, Profssor Sproule was head of the costing and engineering department at Highpark Mill in Covington, Tennessee. In September he joined the Clemson staff where he is presently engaged in research under the direction of Dr. H. M. Brown, Dean.

Warp Ends . . . .

Elderly Lady—"And what is your name, my good man?"

Convict—"909".

Elderly Lady—"Oh, but that's not your real name."

Convict—"Naw, that's only me pen name."

———BOBBIN AND BEAKER———

Professor—"Why are you late?"

Student—"Class started before I got here."

———BOBBIN AND BEAKER———

John—"What did you do with my shirt?"

Roommate—"Sent it to the laundry."

John—"Ye gods! The whole history of England was on the cuff."

———BOBBIN AND BEAKER———

"What is COLLEGE BRED, Pop?"

"College bred is a four-year loaf made from the flavor of youth, and the old man's dough."

———BOBBIN AND BEAKER———

Night Watchman—"Young man, are you going to kiss that girl?"

Student—"No, sir."

Night Watchman—"Well, then, hold my lantern."

———BOBBIN AND BEAKER———

"You're really a very pretty girl."

"Now, now," she blushed. "You'd say so even if you didn't think so."

"Sure, but you'd think so even if I didn't say so."

———BOBBIN AND BEAKER———

"What's the WHISKEY SYMPHONY?"

"Beethoven's Fifth."

———BOBBIN AND BEAKER———

Taxi driver—"I thought that I heard somebody tell me to stop."

Passenger—"Drive on; she wasn't talking to you."

———BOBBIN AND BEAKER———

Patient—"I'm in love with you. I don't want to get well."

Nurse—"You won't. The doctor saw you kissing me, and he's in love with me, too."

———BOBBIN AND BEAKER———

Little Miss Muffett decided to rough it
In a cabin quite old and medieval.
A rounder espied her and plied her with cider
And now she's the forest's prime evil.

———BOBBIN AND BEAKER———

"Stealing a kiss may be petty larceny, but sometimes it's grand."

———BOBBIN AND BEAKER———

"Artist's models make only a bare living."

———BOBBIN AND BEAKER———

Lawyer to Judge—"My client requests an annulment on the grounds that her father didn't have a gun permit."

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Awards Given to Textile Students

In the Honors Day ceremonies last May, textile students were the recipients of four awards. J. F. Cathcart, Textile Manufacturing Junior of Bishopville, S. C., received the Textron Scholarship of $500 which is granted annually to the outstanding junior majoring in Textiles.

Harry Malone Miller, Textile Manufacturing graduate of Chester, S. C., received two awards. He was given the Phi Psi award and the National Association of Cotton Manufacturers Student Honor Medal. The Phi Psi award is given annually to the textile graduate having the highest scholastic record. The National Association of Cotton Manufacturers Award is given every year to the outstanding textile graduate.

The American Association of Textile Chemists and Colorists Award was given at that time to J. P. Clancy, Textile Chemistry graduate of Lancaster, S. C. This award is given to the student who has done the best work in Textile Chemistry and Dyeing.

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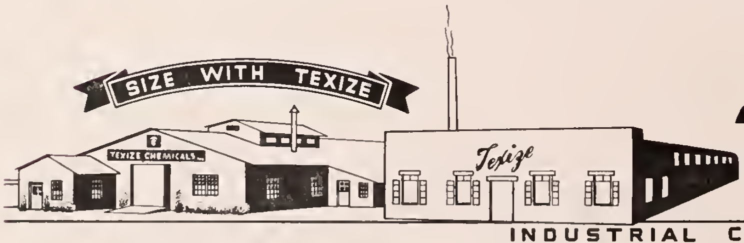

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Bobbin & Beaker

VOL. 8 SPRING ISSUE, 1950 NO. 2

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THE

BOBBIN and BEAKER

Official Student Publication
Clemson Textile School

VOL. 8 SPRING ISSUE, 1950 NO. 2

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The Cover

Textile majors at Clemson are not always fog-bound in a sea of cotton, lint, and grease. Sometimes they have their moments of self expression in other ways than picking out a sample of cloth, manipulating a slide rule, or punching a caculator. Witness the cover for this 10th Anniversary issue, executed by James R. Anderson, the associate editor of the BOBBIN & BEAKER. Anderson refuses to say what the idea is behind the design, or give any other reason for its being. "It's just a cover," he says.

In This Issue

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Dean Brown Reports On Europe

By ROY F. BARRETT, TM. '50

ON October 6, 1949, Dean Hugh M. Brown, of the Clemson Textile School, along with other members of the National Council of Textile Deans, sailed on the Queen Elizabeth for England. The purpose of this trip was to broaden and exchange their knowledge with representatives of the United Kingdom.

One of the first places the group visited with the College of Technology of the University of Manchester. There, the Deans were under the guidance of Professor W. E. Morton, head of the Textile Industries Department. While at Manchester, they also visited the Shirley Institute, research institute of the British Cotton Industry Research Association. Here, Dr. J. W. Hill, Deputy Director of the Institute— ????

Among items of interest to be found at the Institute were, a machine shop, a library, a number of small laboratories, and an electron microscope. One of the interesting machines viewed by the Deans during their visit was an automatic doffer in action. This was developed during the war due to the shortage of doffers. It is claimed that this semi-automatic machine doffs a frame in much less time than did the former method.

The Deans also visited the Textile Machinery Exhibition while at Manchester. According to Dean Brown, many of the looms shown there had no top rigging over the warp; the dobby head was level with the reed cap and positive harness motions underneath the looms. There were also spinning frames completely enclosed giving a streamlined effect, and an Italian spinning frame with a seven-roll system to give drafts as high as 300.

After leaving Manchester, the group spent a short time at Bradford where they were escorted through the school by Mr. H. Richardson. They next visited the University of Leeds, where Dr. J. B. Speakman, head of the Department of Textile Industries was their host.

At Harrowgate, they heard Prime Minister Attlee give a brief talk and later had the honor of meeting Mr. Attlee. lee.

Upon leaving Harrowgate, the group journeyed to Galashields to visit the Scottish Woolen Technical College.

At Bollington, they visited the mill of Thomas Oliver & Sons, where they were presented samples of 300/1 Sea Island and 420/2 Sea Island yarn that was spun on mule frames.

The Deans attended the Anglo-American Textile Educational Conference at Buxton where a number of papers were presented by the British educators and members of the American group. Dean Brown, who is President of the National Council of Textile Deans, and Sir Raymond Streat, of the British Cotton Board, served as co-chairmen of this meeting.

The group next went to Leicester to visit the textile school there. Here was found more knitting work than any other school which they visited.

In London, the International Wool Secretariat explained its work to them.

Among some of Dean Brown's observations during his visit was that the British classes were much smaller than ours and that the students seemed more mature. He explained that this was due to very few students being financially able to attend college. Most of the students attending college had received scholarships given either by the school or by persons connected with industry.

Another thing which Dean Brown noticed was that schools do not require as many social science courses as is the policy in the United States. They confine their work mostly to the technical side. However, their schools carry on more research than is the practice here and the industry looks to the schools for that research. These research projects are carried on both by the faculty and the students. Most of the research is of a practical nature. To give some example of the amount of research being done, during 1948, the textile staff members of Leeds University made more than thirty publications of research, in addition to forty-one special lectures to groups in the textile industry. This type of work is being done at all of the other schools. At the Buxton Conference, Dr. Speakman of Leeds University gave this quotation: "He who learns of one engaged in scientific research drinks from the clear, running stream; while he who studies under one who only teaches, sips the green pool of stagnation."

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Experience Is NOT The Best Teacher

The author of this article, who wishes to remain anonymous, is a graduate of the Lowell Textile Institute, and is well known in the field of textile chemistry. His background over the years is such that he is well qualified to recount the various experiences in the splendid editorial printed below.

Very few, if any, Textile students can know for sure just what they will actually be doing when school is over Some may never enter the Textile industry actively, at all. However, most will at some time or other earn their livelihoods principally (either directly or indirectly) from some phase of the Textile industry. They may be actively engaged in production or selling or may direct their activities to the financing, management or supplying. But in any event most of you are probably wondering when, where or how you may ever get the necessary practical experience in any chosen field to be an important factor therein. If so, forget it. Practical experience you get as long as you live. Besides, no tool in the whole bag of tricks of practical experience can ever be as reliable a guide as sound theory thoroughly learned, plus a mastery of the technique of applying your theory to every current daily problem.

When you emerge from school into the textile industry you will find yourself in a field where much is done by tradition as dictated by practical experience. Definitely you will find few supermen. You will find a great tendency to solve manufacturing problems by the "hunch" system. By that method a certain party—anybody—thinks himself that the source of a given trouble must be "here" or "there." The process is then changed at the suspected point and something different—anything—is tried, to see if correction develops. If no improvement results the same system is resorted to at some other point in the process. In extreme cases the foreman is fired and another is hired who often uses the same method—often right over again—and gets the same result. Many years of observation have convinced this writer that there is too great a tendency in the Textile industry to neglect the tools we have.

ALL PROBLEMS CAN BE SOLVED

In our own experience it is possible to say that every manufacturing problem, no matter how difficult appearing, can be solved by a careful analysis of the facts (after you get them), based upon sound theory. It may be difficult, sometimes, to dig up all the pertinent facts but one must start off with the assumption that the cause is somewhere within the four walls where one works. A thorough search will eventually locate it. The first requisite is to approach the problem with an open mind and with no preconceived assumptions as to where the source of trouble "ought" to be. Measure the problem with the requisite tools, physical, mechanical or chemical. Get some figures which describe it. Find out "what" is "where" and how much there is of it. Find out whether it should be there or not. Encourage every man or department concerned to assist in digging up the facts. Let it be understood at the start that nobody is going to have his neck wrung when the cause is finally uncovered. If you follow that technique you can set off the gremlin hunt of the age. Out of it, everybody will get a little fun and also the satisfaction of having his job run better when the culprit is found. Sad to relate, this method has not always been followed. A few horrible examples of serious, though common, representative mill problems are given below, together with the solutions thereof.

A high grade woolen manufacturer in Pennsylvania suddenly found they could not longer dye any woolen piece dyes level except chrome bottomed navy blues. The dyer was charged with careless work at first and incompetency later and was finally warned that continuance of such bad work would cost him his position. After producing streaky dyed piece goods for three weeks, all of which had to be dyed Black and sold at a loss, the idea began to dawn that here was serious trouble not hitherto encountered. Whatever measures of correction had been tried had proven ineffective and the writer was asked to look at the problem.

One batch of usually easy-to-dye acid dyes was run with surprisingly horrible results. All wet processing was then stopped so we could begin searching for the cause without damaging any more goods. At the same time we ran an analysis of the stained cloth, in their own Laboratory, to find out what elements might be present along with the streaks. The only thing we could find on the streaks that was not present on the undyed yarn was quite a large quantity of Aluminum. This suggested something in connection with the water supply inasmuch as they used an Alum-Soda Ash water clarifying system.

Questioning of the employees who had charge of the clarifying system at first brought out the information that no change in ingredients for the system had been made. However, being still suspicious, we questioned them further, whereupon one recalled that about a month previously they had run out of Alum and the Chief Engineer ordered them to use material from another barrel—unlabelled. The contents of the unlabelled barrel were analyzed and it turned out that the barrel contained Sodium Aluminate. Inasmuch as Sodium Aluminate is not precipitated with Soda Ash, as Alum is, it ran right through the clarify-

(Continued on page 31)

This Magazine And Its Editors

By BERLYN K. SUTTON, TM. '50

The author is greatly indebted to the past editors who were instrumental in making this story possible by submitting pertinent information contained herein.

IN THE Fall of 1939, Iota Chapter of Phi Psi Fraternity initiated a move which resulted in the foundation of a publication known as "The Bobbin and Beaker'.' The first issue of this magazine was published in February of 1940 with a definite purpose—"to distribute interesting subjects concerning all phases of textile manufacturing, to gain a closer tie between the Clemson Textile School and the textile manufacturers, and to afford an outlet for extracurricular activity of textile students". Staff eligibility was and has continued to be limited to any textile student possessing ability, interest, and a willingness to devote much of his time to the publication.

IN THE important initial months of this magazine, a problem was confronted which has become almost hereditary—that of obtaining adequate financial reserves to permit publication. Then, as now, the sole source of revenue was from advertisements. The first staff, under the editorship of Mr. C. E. Anderson, worked in relative "darkness", and was charged with the responsibility of producing the "first" in such a manner that "The Bobbin and Beaker" might live on and on.

Mr. Anderson presently holds the position of Industrial Engineer with Monarch Mills in Union, S. C. Upon graduation, he accepted employment with the New York Office of J. C. Penney Company where he worked as textile technician in the Research Laboratory. He remained there until February of 1941, at which time he entered the United States Army. There he served with the Armored Infantry of the Fifth Armored Division as company commander and unit S-4 until January of 1946, when he returned to inactive status with the rank of Major. Since then, his occupation has been with Dayton Rubber Company and Deering Millikin and Company.

EACH new staff has found itself faced with new problems and responsibilities. In 1940-1941 difficulty was again experienced in securing funds, as well as with details of correct mailing addresses and the acquiring of articles which would be of interest to the three different classes of readers which this publication must satisfy. (students, alumni, others). It was this energetic staff which obtained a room in the new textile building for use as on office.

Mr. William R. O'Shields, who piloted the staff as Editor that year, is presently employed at Judson Mills in Greenville, S. C., where he is Superintendent of the Preparation Department. For a short while after graduation, Mr. O'Shields was with E. I. du Pont de Nemours and Co., Inc., after which time he entered the training program at Judson Mills. During World War II, he served for a five year period, part of this being as Battalion Headquarters Commander in New Guinea and the Philippines. After discharge in 1945, he engaged in work at Judson Mills in the Laboratory and Assistant Plant Superintendent's Office.

FURTHER indications that troubles are never ending on a publication such as this are evident from the report of Mr. Gordon E. Williams who was Editor of the 1941-1942 Bobbin and Beaker. That year, students lacked the necessary interest in writing. Mr. Williams points out that "this is a tragic mistake made by far too many college students, for the student who graduates without the ability to prepare intelligent reports on his work is sadly handicapped in industry".

Mr. Williams graduated from Clemson in 1942, entered the Quartermaster Corps and later transferred to the Air Corps. His overseas duty was in China and India, where he received the D.F.C. with two oak leaf clusters. Since his discharge as a Captain in 1945, he has been with Judson Mills in Greenville, S. C., as an Industrial Engineer.

THE beginning of the war created new elements in the parade of hardships for the 1942-1943 staff, which found itself faced with a paper shortage, transportation difficulties, and a limited "no advertising" policy on the part of many supply houses. Confronted with these wartime disadvantages, the staff managed to publish commendable magazines as had been done in the past. However, due to these handicaps and the uncertainty of how many students would be in school during the subsequent year, it was decided that publication would be suspended until after the war.

The Editor-in-Chief during this significant year was Mr. M. D. Moore, Jr., who now is with Enoree Mills in Enoree, S. C., where he has been engaged in setting up and getting into operation a laboratory and standards department and acting as "pinch-hitter" for the Night Superintendent. Some two months after graduation, in 1943, Mr. Moore was called to the service of our country. He underwent officers training at Fort Benning, Georgia, and after receiving his commission spent periods in Texas, New Jersey, and Pennsylvania at various camps and duties. Later he saw duty in the European Theater of war, and after cessation of hostilities was in the Army of Occupation. Being engaged in the Army Education Program, he was offered a furtherance of education by schooling in Paris and England. Upon discharge, Mr. Moore accepted a position on the faculty of the Clemson School of Textiles which he occupied for one semester, after which he became engaged in work for his present employer.

IT WAS three years later that "The Bobbin and Beaker was reactivated, and again it was Phi Psi Fraternity which set the precedent, reviving the element of education which it had founded six years before. With a Fraternity loan for the purpose of beginning the administrative details, this staff found itself in much the same situation as the 1939-1940 group. Under the Editorship of Mr. William E. Broadwell, the first post war issue of this magazine made its appearance in November of 1946.

The chief difficulty, which time greatly eliminated, was a lack of experienced staff members. It was during this year that the two-color cover on this magazine was first presented. This was quite an improvement over the old black and white cover. The 1946-1947 staff is due great praise for reviving this activity which has given and will continue to give students the opportunity to exercise their "hidden talent" as well as inform the textile industry that there is a Clemson which is greatly interested in them.

Mr. Broadwell was winner of the National Phi Psi fraternity award in 1947. Upon graduation, he studied at the Institute of Textile Technology. Since 1948 he has attended Harvard Business School, from which he expects to receive a M.B.A. degree in June of 1950. His intention is to enter the textile industry upon graduation.

IN 1947-1948, under the direction of Editor Harold R. Valerius, it seems that only minor troubles were encountered, and these were overcome with satisfaction. Mr. Valerius was in the Army for two and one-half years, this time being mostly spent in the Hawaiian Islands with the Adjutant General's Office. He received his degree from Clemson in June of 1948, and has since been employed by E. I. du Pont de Nemours as an Equipment Development Engineer at the Seaford Nylon Plant of Seaford, Delaware.

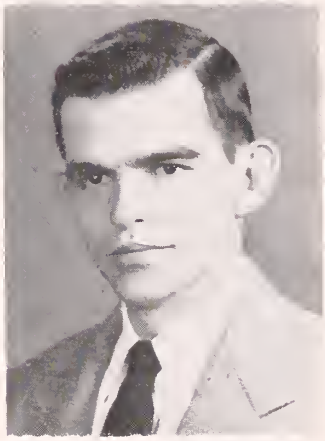
DURING the 1948-1949 session there was a decided lack of cooperation from students in writing for the magazine. It was in this year that Professor Robert K. Eaton, who was serving as Faculty Adviser for The Bobbin and Beaker, passed away. Mr. Eaton had been on the Clemson faculty since 1923, acting as Dean of Clemson Textile School from 1943 to 1945.

Two issues appeared that year, under the Editorship of Mr. Robert J. Cheatham, Jr. Mr. Cheatham served with the Ninth Army in the European Theatre for a period of two and one-half years. Having attended Clemson for one semester before entering the Army, he returned in 1946, and received his B.S. Degree in June of 1949. Since then, he has been engaged in employment for United Rayon Mill at Elberton, Georgia.

GORDON E. WILLIAMS

C. E. ANDERSON

M. D. MOORE


E. T. BROADWELL

H. R. VALERIUS

R. J. CHEATHAM

IN THE tenth year of this magazine, the present staff is honored to carry on an activity which was started a decade ago with definite goals to be reached.

It is interesting to note that each staff, even though it has been confronted with a different array of obstacles, has met these situations, and even made some valuable contribution to, or improvement in, The Bobbin and Beaker. This should be an inspiration to the ones in the future who are privileged with the responsibility of "carrying on". These men will face other and some of the same drawbacks. It is this experience of meeting and overcoming the difficulties which furnishes the greatest value of working on a student publication! It is this experience, also, which provides the concrete proof that one of the purposes set forth ten years ago is being realized—that of providing an extra-curricular outlet for textile students. It is hoped that The Bobbin and Beaker readers of the past have realized some value in the literature which has been presented, since that is the primary purpose of the magazine, and the objective which each staff must strive to obtain.

To the staffs of the future we say this: Never forget that in your hands is one of the greatest college opportunities to be had, and with you rests the duty of presenting Clemson Textile School and the textile graduate of this school to the industry!

Textiles In South And Central America

By MR. W. B. HANKINSON
United Merchants and Manufacturers, Inc.

ABOUT THE AUTHOR: Mr. Hankinson, a graduate of the Georgia Tech school of electrical engineering, has been with the United Merchants & Manufacturers Corporation since 1931, and has ten years of experience behind him with the company's mills in South America. He is now in charge of the Service Department, and is well qualified to discuss the opportunities in South America in the field of textiles.

STUDENTS of Latin America have noticed that during the past two decades there has ben an increasing trend toward industrialization throughout quite a few of the countries of South America. In the past, the economies of all of these countries were based almost entirely on agriculture and, although the production of food stuffs, etc. is still a leading occupation, employment rolls throughout the various industries are increasing by leaps and bounds. Manufacturing is mainly confined to consumer goods such as farm products, tobacco, shoes, small electric appliances, but also includes petroleum and a few isolated cases of the heavier industries such as steel and iron works.

ARGENTINA AND BRAZIL BIGGEST TEXTILE PRODUCERS

In the forefront of this movement stands the textile industry which in most cases comes second only to the production of food, beverages and tobacco. Argentina and Brazil are naturally the biggest producers of textile fabrics, being the two largest and most economically advanced countries of South America. For instance Brazil operates around three million spindles and ninety thousand looms and Argentina has a smaller amount of machinery. To a lesser extent other countries also boast of their textile industry such as Peru, with its Grace Mills, and Mexico with its Burlington-sponsored plants, as well as Venezuela and Uruguay (which are more or less in the infant industry stage.)

In Brazil, the majority of the textile industry is centered in the region of the very modern and swiftly expanding City of Sao Paulo. In Argentina the center of industrial activity is Buenos Aires with its population of almost three million. Practically all of the textile industry is located in and around this metropolis of South America.

JOINT OWNERSHIP OF MILLS

Almost all of the mills throughout South America are owned jointly by foreign capital and capital of the country, in which they are located. Both the officers and stockholders are more or less divided between citizens of the country and so-called foreigners (such as English, Americans, Germans, French, etc.)

An adequate labor supply for textile mills does not present any grave problems. In Argentina and Brazil, there is no great difficulty in obtaining alert, intelligent workmen, who, if not already partially skilled in textile trades, can be quickly taught how to run the various machines. In the case of supervision or top management, however, it is another story, as experienced, well trained and well educated technical supervisors must be imported from abroad. It is within this sphere that opportunity lies for the American textile and engineering student.

As my experience has been confined to the methods and operations of the foreign plants of United Merchants and Manufacturers Inc., I can only describe their procedures but in general I think these are used by the majority of American firms operating in South America.

To begin with, only top personnel is ever sent to South America (with the exception of a few specially skilled workmen such as loom fixers.) This is due to a desire to keep down overhead and also because laws of the different countries forbid any factory to have more than 25% of its employees rolls composed of foreigners.

SELECTION A PROBLEM

In order for a man to be sent to South America, it is necessary that he not only have a textile or engineering degree but that he also have ample practical experience in a mill, since aside from the administrative function of his job

Located in Argentina is this modernistic mill which is engaged in the processing of cotton yarns.

An aerial view of a new mill in Maracay, Venezuela, which shows the power plant in the center and the weaving and finishing plants on either side.

he must also be thoroughly enough versed in the operation of the various machines that he can act as an instructor or as a "trouble shooter" as the case may be.

To meet this problem we are engaging in a training program for which we hire several promising graduates each year. These men are placed in our domestic mills for a period of at least twelve months. During this time they actually work on the various machines in the different sections. This, of course, may seem to be a review to some of the textile students but it is a very necessary step, if a supervisor in a South American mill is to be capable of answering the many, many questions which will arise daily. It is also almost vitally necessary that the students have a knowledge of the Spanish language and very valuable also is some acquaintance with Latin American social customs and psychology. When going into a South American country, he must recognize that he is the foreigner and the guest of the country into which he is moving. Customs may be slightly different and it is up to him to adapt himself insofar as possible, to the customs of that country. If he should go to a large city, such as Buenos Aires, or Sao Paulo, he will find living conditions very satisfactory and comparable to those in any large city in the United States. Should he go to one of the smaller interior towns he will find conditions far more primitive than he would find in a small town in the United States. In general he should investigate thoroughly the country to which he contemplates going as well as the company which he intends to join.

OPEN FIELD

It can readily be seen that opportunity for advancement is great and any young man, who is genuinely interested in living abroad can find ample territory in which to grow and expand his knowledge of textile manufacturing. He will find that he is not restricted to one unit of the mill as much as he would be here in the United States but, being a member of management, he is also involved in personnel policy, general administration of the mill, etc. These opportunities are not limited to textile graduates but are also open to mechanical, electrical and chemical engineers as our plants operate their own steam and power as well as their own bleaching, dyeing, printing and finishing departments.

United Merchants and Manufacturers' policy is to hire a man for two years, send him down with traveling expenses fully paid. Should he desire to stay with the company after his two year period, he is sent back to the States for a two month vacation, after which he is sent back to South America for another year.

Having spent ten very informative years in an "American" company mill, in Buenos Aires, I can heartily recommend this field to any textile graduates interested in foreign service.

It is with pleasure that the

Bobbin and Beaker announces that

MARION KIRBY

and

SAM MORRAH

have been approved to edit this magazine for the year 1950-51.

Mr. Kirby is from Laurens, S. C. He has served capably on the present staff and was recently elected to head the Phi Psi Fraternity for the coming year

Mr. Morrah, who has also been a reliable staff member this year, has been outstanding in the Clemson Corps of Cadets where he has held the position of Battalion Sergeant Major. He was recently taken into Scabbard and Blade, Clemson's top military fraternity. He is from Greensboro, N. C.

"Orlon"- du Pont's Latest

By **D. M. THORNTON**, Manager
Sales Development Section, Acetate Division
E. I. du Pont de Nemours & Company, Inc.

THE first half of the 20th century has seen phenomenal changes in the fields of transportation, communication, and power. The airplane, automobile, radio, telephone, and hydroelectric power generator have been revolutions in their respective fields. The advent of synthetic fibers has been the herald of tremendous changes in the field of textiles that can be expected during the years ahead. One has but to mention the impact of nylon on the women's full-fashioned hosiery market or the growing acceptance of rayon for automobile tire cord to be aware of the present dynamic nature of the textile industry.

In 1948, some 6.5 billion pounds of apparel type textile fibers were consumed in this country. Whereas in 1914, the production of synthetics was negligible, by 1939 synthetics accounted for 9% of total fiber consumed and in 1948 the synthetic fiber production was 19% of the total. This growth has been due primarily to the fact that synthetics are engineered to meet functional and aesthetic demands by consumers and at a price that gives maximum value per unit cost.

Other important changes in the textile industry are due directly to the emergence of synthetic fibers. The experimental production of men's suiting fabrics has been accomplished in two-thirds as many processing steps as is normally required for the production of an equivalent wool fabric. Other processes, still under development permit the production of similar synthetic fabrics in even fewer processing steps. Thus the era of revolutionary change in textile machinery also is well under way.

FIRST PLANT AT CAMDEN, S. C.

One of the latest additions to the field of man-made textiles is "Orlon" acrylic fiber—a product of Du Pont research and development. The first "Orlon" plant is under construction at Camden, S. C., and is expected to be in operation by the latter part of this year. The plant (known as the May plant) will produce continuous filament "Orlon" only in deniers of 400, 200, and 100. All of the first production is expected to be 2.5 denier per filament. In the meantime, pilot plant facilities have been in operation and the small poundages produced have been utilized in the market development of promising end uses. The interest shown by the industry has been widespread and it has not been possible to comply with all the many demands for samples for evaluations.

The question might be asked—why this tremendous interest in "Orlon"? Basically, the answer lies in the **combination** of useful properties in "Orlon" which indicate its applicability to a wide variety of textile uses. It is desirable to emphasize the fact that **combinations** of properties determine the utility of a fiber in any end use. No fiber is universal in application. Each serves in end uses where its combination of properties commend it over competing fibers.

Shown above is Orlon in a few of its applications

VARIED PROPERTIES

"Orlon" possesses a generally high level of outstanding properties and in addition is unique among all fibers in offering the combination of characteristics best expressed by:

Appealing texture
Durability or resistance to degrading influences
Ease of care
Covering power or bulk with light weight

Appealing texture is one of the most important characteristics demanded in an apparel fiber. "Orlon" offers an extremely appealing texture combined with desirable ease-of-care features and a high level of durability. The appealing texture of "Orlon" fabrics is due to their warm, crisp hand combined with very attractive draping characteristics. "Orlon", like cotton, is readily wetted by water or perspiration, which is an exceedingly important aspect of the comfort of garments, particularly, those worn next to the skin.

(Continued on page 38)

Clemson Students' Paper Wins Contest

JAMES L. NEAL, T. C. '50

THE Piedmont Section of the American Association of Textile Chemists and Colorists held the first of their planned annual student chapter contests in Winston-Salem on April 1st.

Students from Clemson and North Carolina State College participated since only these schools have textile chemistry departments within the Piedmont Section which is composed of members from South Carolina, North Carolina, and Virginia.

At the technical session of the Winston meeting, two papers were presented from each school. "The Effect of Abrasion on the Dyeing Characteristics of Cotton" was prepared by Kenneth Jenkins of Asheville and Harold Keels of Greensboro, North Carolina. "An Investigation Between the Amount of Dye and Sensation Obtained and Its Possible Application In Textile Dyeing" was prepared and presented by Hanri Cikurel of Izmir, Turkey. These students were representing North Carolina State College. "The Dyeing of Nylon With Vat Colors at Normal Temperatures" was prepared by Thomas Carter of Langley, South Carolina, James L. Neal of Fort Mill, South Carolina, and Neal Westmoreland of Winston-Salem, North Carolina. "Testing for Honeydew on Raw Stock Cotton" was prepared by W. H. Keasler of Westminster, South Carolina. This group of students represented Clemson College. These papers were based on research on textile subjects carried out by the students during the current year. The judges for the contest, Dr. Harley A. Jennings, Dan River Mills, Danville Virginia; Linton C. Reynolds, Riegel Textile Corporation, Ware Shoals, South Carolina; and Clarence Hooper, Burlington Mills, Burlington, North Carolina. stressed originality, scientific and practical value in presenting the awards.

Members of the Student Section Contest Committee which was responsible for conducting the contest are as follows: A. R. Thompson, Chairman, Ciba Company, Inc.; W. L. Barker, National Aniline Division, Allied Chemical & Dye Corporation; S. H. Williams, General Dyestuff Corporation, all of Charlotte, North Carolina. The Clemson paper prepared by Thomas Carter, James L. Neal, and Neal Westmoreland was awarded first place with second place going to the paper prepared by Hanri Cikurel from North Carolina State College.

From its earliest introduction, one of the problems in handling nylon was to dye this fiber with colors which has a satisfactory degree of fastness to light and washing. This problem led the Clemson students to select this subject for research. In the work, an effort was made to find a solution to the difficulties encountered by the finishing plants in obtaining both these specifications in a satisfactory range of colors.

Since vat colors are the answer to the problems of fastness on many other fibers, the application of this group to nylon has been the subject of much experimentation since this fiber first appeared on the market. However, the members of this group have proven to be inconsistent in their behavior when applied to nylon, some members giving shades of very good resistance to wet processing, but often very poor light fastness. The vat colors must, in most cases, be applied to nylon at high temperatures near the boiling point of water. Even under this condition a characteristic behavior of all the dyes of the vat group toward nylon cannot be obtained, some giving very good shade depths, while others hardly stain the fibers. Also, many of the dyes giving fair depths of shade are radically changed at the high temperatures used, and in many cases their light fastness is sharply lowered.

After many trials with different chemical assistants it was found that by treating the nylon with one of the common organic acids the affinity of the nlyon for the vat colors was greatly improved. Following up this lead, a procedure was developed by which nylon could be dyed at a low temperature (120-140 degrees F.) with vat colors.

It is felt that the work finished so far on this problem shows promise that the method developed by these students for dyeing nylon may make possible the following:

1. Improved light fastness with the majority of vat colors, together with the elimination of radical shade changes on exposure to light.
2. A higher degree of wet fastness than possible with most of the dyes in use on nylon at present.
3. Better color yields with most of the vat colors, and tremendous increases with many.
4. A better range of shades, by making it possible to use dyes which show little affinity for untreated nylon.
5. Easier production of union shades on nylon mixed with other fibers.

The officers and senior members of the Section expressed themselves as being greatly pleased with the quality of the work apparent in all the student papers presented and feel that the student contest has established itself for the future.

The following faculty members and students from Clemson were present at the Winston meeting: Dr. Joseph Lindsay, Jr., Dr. James H. Langston, Dr. William T. Rainey, Jr., Thomas Carter, Roy H. Boggs, Arthur W. Bloxham, Jack A. Ingle, Thomas L. Howle, H. Islam, William L. Mathias, Guy N. Thompson, and James L. Neal.

Clemson's Textile School, 1896-?

JACK L. BROCK, TM '50, and
ROBERT L. GREGG, TM '50

THE evolution of Clemson's School of Textiles, one of the greatest textile schools in the world, is not the result of any individual's accomplishments, or of any institution's accomplishment. It is the result of concerted action by our industrious and progressive leaders who possessed the insight and wisdom to see what the future held and holds in store for the youth of our country.

J. H. M. Beatty, at one time a prominent textile executive, said, "The best way to develop an industry is to develop those engaged in that industry". Now let us go back a few years and view the development of the textile industry in South Carolina.

There is evidence from a Charles Town Gazette of December 22, 1763, establishing the fact that cotton goods were then made in this state, but the first mill (containing 8,400 spindles and 300 looms) was built by William Gregg in 1846. After a long and bitter fight in the General Assembly, Gregg secured his charter for the organization of his mill at Graniteville. The outstanding periods in South Carolina's development of the cotton mill industry may be dated in the year 1847, when the Graniteville company first put its goods on the market, and the early 80's when other pioneers began to see the possibilities of the greatest industry in our state.

At the beginning of the Civil War there were eighteen mills in the South, and eleven survived. Between this catastrophe and the movement of 1880 only three mills were developed. Then, with a spirit of wisdom and courage, an unusually able group came forth to build up and guide the present-day textile industry.

The men blazing the trail for a rising picture of industrial romance were D. E. Converse, Lewis W. Parker, Captain Ellison A. Smythe, Col. J. P. Hammett, Dr. C. C. Hamrick, Captain J. H. Montgomery, Leroy Springs, and D. A. Tompkins.

D. A. Tompkins, who was promoter of the South Carolina Textile school, North Carolina Textile school, and Mississippi Textile school, once said, "I conceive Clemson College to have been established in deference to the wishes of the people of the state to have a school where the youth of the state could, in getting an ordinary college education, do it in a way that would qualify them to find an easier entrance into some profitable occupation than it was found could be done from the ordinary literary institutions. The education and training given at such an institution ought to be of a kind that is calculated to be most useful to the graduate and also of the greatest advantage to the other people of the state at large".

MOVE FOR CLEMSON BEGUN

Ben Tillman, an Edgefield farmer, began in 1885 to agitate the matter of South Carolina's establishing an agricultural college. This agitation led to a convention of state farmers in 1886, and the acceptance of (by the General Assembly of South Carolina) the Honorable Thomas G. Clemson's request in November, 1889, resulted in the founding of Clemson Agricultural College.

His will provided for the founding of Clemson Agricultural College on the greater part of his Fort Hill estate (then 800 acres), and for it's control by a board of trustees. His will also provided funds ($58,539) which he had in various investments. Thus Clemson College was established as one of the many Land Grant Colleges under the Morrill Act of the U. S. Congress of 1862.

Mr. Clemson, having studied in Paris under some of the greatest scholars of his day, was well-fitted for the founding of a great technical school. His ideal was an institution where the poorer boys of South Carolina might acquire scholarship and technical ability. Clemson College, located on the old homestead of John C. Calhoun—the dividing line between Oconee and Pickens counties in the picturesque foothills of the Blue Ridge Mountains, some nine hundred feet above sea level—commands an excellent view of the mountains to the north and west, some of which attain an altitude of nearly 5,000 feet, and provides an aura favorable to the highest physical and mental development of our youth.

The Board of Trustees began a building program for Clemson in 1890, and the institution was open for admission in 1893. Clemson was, as the name "Clemson Agricultural College" implies, chiefly a school of Agriculture, but with a field so discernible as textiles hastily growing around her, and an eye on the "ideal" of Mr. Clemson, the school seemed made for the pioneering textile field.

TEXTILE SCHOOL FOUNDED

A few years later in 1896 the Textile School was founded. Mr. Whit Dillard, Textile School Mechanic, is capable of recalling many interesting and memorable facts about early Clemson: the non-paved streets, the old oak-post supported lamps for night lighting the sidewalks, the old stockade used to hold and shelter State labor, which manually constructed the textile building, and the few buildings of a growing institution set aside in a peaceful forest like a glowing ember becoming brighter and brighter until it bursts into flame and lights up the surrounding countryside.

The original textile building, completed in 1898 and now known as the Physics Building, was designed for educational and experimental work from plans furnished by experienced mill designers. The two-story left wing and the three-story right wing, with the stairway tower in the middle, characterizes the building as retaining a mill feature. This 168' x 75' building was equipped with a system of steam heating humidifiers, shafting, and automatic sprinklers all installed in the most approved manner, and ten thousand dollars worth of machinery which was contributed to the college by manufacturers.

The entire equipment of machinery was given as follows:

Maxon Machine Works, Taunton, Mass.—One revolving flat card, one drawing frame, one spinning frame, one plain loom, and one dropbox loom.

Saco-Petee Machine Shops, Biddeford, Me.—One revolving flat card, one drawing frame, one railway head, one slubber, one roving frame, one spinning frame, and one spooler.

The Draper Company, Hopedale, Mass.—Two Northup looms, one beam warper, one spooler, one twister, spindles, separators, lever screws, cradles, temples as required.

The D. A. Tompkins Company, Charlotte, N. C.—One combination yarn reel, one band machine, one warper beam, one doffer box, one loom box, one electric switch board, one drawing-in frame.

The A. T. Athuton Machine Company, Pawtucket, R. I. —One combination breaker and finisher lapper, with hopper feeders attached.

Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa.—One 30 H. P. electric motor.

Jones and Laughlin, Pittsburgh, Pa.—All shafting, hangers, pulleys, couplings, etc.

Metallic Drawing Roll Company, Indian Orchard, Mass. —Metallic drawing rolls as required.

At the time this constituted very ample equipment for spinning and weaving, and the machinery came from the shops of builders of the most modern cotton-mill machinery.

The curriculum committee of Clemson College, which consisted of the Hon. R. W. Simpson, the Hon. D. K. Norris and President Henry S. Hartzog, held a meeting in Charlotte, N. C., and adopted the following course of study for the textile department at Clemson:

FIRST TEXTILE CURRICULAR

FRESHMAN CLASS

Hours per week

Theoretical	1st T.	2nd T.	**Practical**	1st T.	2nd T.
Math	5	5	Wood Work	4	4
English	5	5	Mech. Drawing	2	2
			Freeh and Draw.	3	3
History	5	1	Forge Work	4	4
Agriculture	0	4	Drill	2	2

SOPHOMORE CLASS

Math	5	5	Wood Work	2	2
English	5	3			
Descrip. Gmty.	2	0	Mech. Drawing	2	2
Chemistry	3	3	Foundry	5	5
Nat. philosophy	0	2	Chemical Lab.	4	4
History	5	1	Drill	2	2

Second term—Chemistry first half; Descriptive geometry second half.

Second term—Chemical laboratory first half; Mechanical drawing second half.

JUNIOR CLASS

Math	5	5	Machine Shops	5	5
Physics	2	2	Mech. Draw & Design	4	3
Textile Eng.	5	5	Textile Eng.	6	6
English	2	2	Drill	2	2

SENIOR CLASS

Textile Eng.	8	8	Shop Work	5	5
History	2	2	Mech. Drawing	2	2
English	2	2	Textile Eng.	8	8
Military Science	1	1	Drill	2	2

This course as laid out comprised a system of liberal education and culture as a part of the textile training. The first two years of the course were the same as those of the mechanical department. The object was to make a course in which the students were not only given special knowledge and training on textile subjects, but were at the same time, and along with special education, receiving the advantages of a good general education.

Mr. J. H. M. Beaty, the first Director which is equivalent to a Dean of Textiles at Clemson until he resigned in 1905, sums it up as: "the purpose of the school is to teach the arts of cotton manufacture, and to give practice in applying methods and principles employed in these arts—in short, to tell the individual what to do, show him how to do it, and then let him practice with his brains and fingers in doing it. The school was established primarily to direct young men who wished to make the cotton mill industry their business in their study of cotton; to teach its manipulation and the after process of manufacture demanded by trade, and as a result, to help build up the Southern milling industry."

But had Mr. Beatty realized the development of synthetics, he might have reworded his statement which deals only with cotton.

GROWTH EVIDENT

As the Textile Department opened on September 14, 1898, Clemson enrolled 446 students. The school year of 1899-1900 saw from an enrollment of 461 students, a graduating class of 28, four of whom received Textile degrees. In the class of 1901 there were 483 students with 31 being graduated, nine of these graduates were textile men. The textile class of 1902 increased, and from a student body of 500 with 59 graduates, 17 men graduated in Textiles. The Textile School of Clemson has constantly grown, though not without variation, to an average enrollment for the year 48-49 of 813 students, of whom approximately 150 graduated in February, June and August periods.

There have been five deans of Textiles at Clemson: J. H. M. Beatty approximately 1898-1905; C. S. Doggett, 1905-1927, H. H. Willis, 1927-1943; R. K. Eaton, Acting Dean from 1943-1945; and H. M. Brown, 1945 to ——. For the year 1926-1927, the Textile Department was under the School of Engineering and Dean S. B. Earle was in charge. Much of the progress made by the school can be attributed to these worthy gentlemen.

In 1921, the United States Department of Agriculture, in co-operation with Clemson College, established a cotton spinning laboratory in the Textile School at Clemson. This laboratory, with only one similar laboratory which is maintained in College Station, Texas, was set up to test cotton samples from various Federal and State experimental stations throughout the Cotton Belt, in connection with the Federal-State cotton breeding and improvement programs. These cottons are tested for their fiber and spinning qualities.

In May 1927, Phi Psi Fraternity chartered Iota Chapter at Clemson College. Phi Psi is the largest and most respected textile fraternity in the world, and its alumni hold some of the highest positions of trust and responsibility in all branches of the industry.

The Iota Chapter of Clemson College bases its membership on scholarship and personality, taking into its fold only the top ranking men of the Textile School. The students majoring in Textile Chemistry, Textile Engineering, and Textile Manufacturing are eligible for membership. In

(Continued on page 36)

Southern Boom

By JAMES R. ANDREWS, TM. '50

This article is a digest from some of the information found in the December 15, 1949, issue of the American Wool and Cotton Reporter. We express our appreciation to that publication for permitting this condensed version appearing here.

Textile mill construction is the best example of industrialization in the South today. And, according to the construction firms who are responsible for this building, no abatement is seen for the immediate future as they always seem to have new contracts. Millions and millions of dollars have been spent in the textile industry since 1944, for new construction, remodeling, and new equipment. Textiles have undoubtedly led the way in the industrial expansion of the South in this, the greatest period, from 1945 to 1949. There has never been a period like it before.

And, it's not over yet. Many mill men, engineers, and observers report that corporations have programs calling for huge outlays of money for continued expansion within the next few years.

Typical of this trend is shown by the Daniel Construction Company, Inc., of Greenville, South Carolina and Birmingham, Alabama, which has completed four finishing plants in the past year alone. This brings to 28 the total number of large plants which they have built since 1944.

Another organization which has had no small part in the expansion of the South is the C. M. Guest & Sons Company, general contractors of Anderson, South Carolina and Greensboro, North Carolina. Since the end of the war. they count almost fifty projects to their record of achievement, most of which have been textile mills or major modernization programs.

J. P. Stevens & Company, Inc., has probably had the most extensive post-war expansion program, with over a dozen additions to their chain, centered mostly in the Carolinas. Deering, Milliken & Company, as well as Textron, Inc., are other concerns which have made notable expansion progress during this post war period.

It is interesting to note that in almost all instances of new mill construction and enlargement, new machinery was installed throughout as textile men sought to bring their plants and equipment up-to-date with the latest machines and processes.

No one knows just how long the present rate of expansion will continue, but mills have enough work planned to keep the process going for several years, some having programs calling for a ten year period or more for completion.

SOUTHERN STATES INVITE MANUFACTURING

And, the various Southern states are making the most of the many advantages of building the textile industry in the South. Through the various State Planning Commissions, much data is available to interested parties which point out the possibilities of locating in this section, including the pleasant community characteristics for workers and their families.

In addition to that, good government in these states has made the overall picture much more attractive. The tax structure in South Carolina, for instance, is ideal for industries large or small. And, according to L. W. Bishop, director for the South Carolina Research, Planning & Development Board, the movement of industry into the state is like taking the cork from the bottle.

South Carolina has led this section in its post war expansion, with the Piedmont section being the principal area for textile production, although many plants have been established elsewhere in the state. In all cases, the people were anxious to work and there was an abundant supply of excellent labor.

Besides the addition of many new mills into the state, many of the giant established concerns such as Springs, Self, Deering, Milliken, Stevens, and Textron have been among those to undergo expansion. This is proof to many observers that profits lie in the combination of location, able workers, skilled management, and sound government both on the state and local levels.

Mr. Bishop points out that the executive department and legislature members know that payrolls and not taxation bring the greatest prosperity to communities. "They believe that industry should bear its proper shart of governmental costs but they do not believe that industry should be persecuted or penalized by taxation or by burdensome regulations," he says.

As a result of this philosophy of life, almost half a billion dollars have been spent or allocated for industrial expansion in South Carolina since 1945, with textiles being the principal spender.

Many of these new mills have been built outside of the congested city areas with no problem arising from any scarcity of labor. As a matter of fact, there is to be found throughout the state an abundance of native-born workers, skilled in their jobs, and within easy traveling distance of any mill in the section.

Thus it is that the movement to South Carolina is like taking the cork from the bottle. Once the cork has been removed and the flow of liquid has been started, there seems to be little to stop the flow. However, the South Carolina Research, Planning & Development Board makes no effort to detract from the advantages of other states. It merely states, to those interested, what the state and its communities have to offer, what the tax structure is, facts about the labor supply, utilities and highways, and always facts about the people.

The Southern States offer a fertile territory for textile

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Textile Research At Clemson

By WILLIAM M. KIRBY, JR., TM. '50

WHAT is one of the key words in the textile industry today? It is no longer practical to assume that, "it is running right now so let well enough alone," but the big question is how are we going to improve the quality of textile fabrics and yet maintain production so that the price range will remain within the means of Mr. Average Public? The answer is research. Dr. H. M. Brown, Dean of the Textile School, has installed a research program that may prove beneficial to all phases of manufacturing and finishing of textile fabrics. The following experiments are now or have been made by different professors under the supervision of Dr. Brown.

SPINNING DEVICE

Mr. William Sproule is experimenting with a new spinning device which employes an entirely different technique to the spinning and twisting processes. This device will insert the twist to the drafted sliver between the delivery rolls and thread guide which seems to result in the following features:

(1) Fewer ends down
(2) Better package yarn
(3) More production
(4) Better quality yarn
(5) Reduction in labor cost
(6) Decrease in tension of the yarn between delivery rolls and thread guide which is the most sensitive point.

Other information regarding this invention is not available at this time but further tests and studies are being made.

CONSTANT RATE LET-OFF

Turning our attention toward the weave room we find that Professor W. H. Frick has been making a number of experiments on a constant rate type let-off which would let off the same amount of warp each pick—pick by pick—throughout the entire weaving of a beam. To perform these tests a loom was set up to make 56 picks per inch using a warp count of 16's and varying the filling counts from 11's to 33's. By adjusting an old type semi-automatic Barlet let-off motion so that the whip roll would not operate to keep constant tension on the warp, a constant rate of let-off was obtained A filling count of 16's was used as a starting point; when working down to a coarser yarn the tension increased for several inches at each change of the count but would then remain constant. When working upwards to 33's the same results were obtained with the warp becoming slacker but at no time throughout the experiment was there too much or too little tension to prevent weaving of the cloth. The same pick gear was used and the amount of depression of the warp ends were measured under similar conditions at each change of a filling count. After completing this run of cloth under the constant let-off set up, the loom was converted back to normal operation and the same filling counts used. The cloth made under the two different methods was then desized, stretched, and allowed to dry under tension not holding the width constant, after which a comparison was made and no noticeable physical difference existed.

The advantages of this type let-off principle would be (1) to change the rate of take-up it would only be necessary to change a crimp gear; (2) would make a more uniform product; (3) simple adjustment for style changes.

More research will be done on this principle when necessary supplies are received that have been ordered.

The textile school has also carried out some research in conjunction with the Du-Mont Laboratories on the Cathode-Ray Oscillograph. Until recently, the primary use of the Cathode-Ray Oscillograph was in the field of electronics.

For the study of loom motions and timing, the Polor-Coordinate Indicator was found to be suitable in the study of textile machinery. Dr. Brown reports that a loom can be checked in a matter of minutes and that the timing of the shedding, picking, boxing, stop motions, and shuttle speeds were satisfactorily checked at Clemson.

This new application of the Cathode-Ray Oscillograph will possibly aid in research and production problems which should result in improved machinery, better products, and more economical operation of textile mills.

STROBOSCOPIC STUDY

Various stroboscopic means and high speed photography have been employed in the study of running looms in the past. These studies have required special lighting arrangements and other elaborate means to make these observations.

Professor E. A. LaRoache, in cooperation with General Radio Company, has completed a rapid stroboscopic study of production looms. His chief goal was to develop a method that would, (1) be sufficiently rapid to make it practical to check looms in production in order to correct defects before they could cause stoppages or seconds; (2)) be compact and streamlined for minimum interference in the loom aisles; (3) operate in normal mill illumination; (4) not interfere with the operation of the loom while making the test. By employing certain techniques they were able to make a study of loom timing and consider the Stroboflash method to be of outstanding value for critical observation study of the various phases of the weaving operation. The apparatus is easy to use and it is believed that experienced operators can check the timings at the rate of only two or three minutes per loom.

MEASUREMENT OF SPECIFIC SURFACE

A recent development of the textile industry is the measurement of fiber specific surface by passing air through a compressed plug of fibers.

(Continued on page 28)

Let's Visit The Textile School

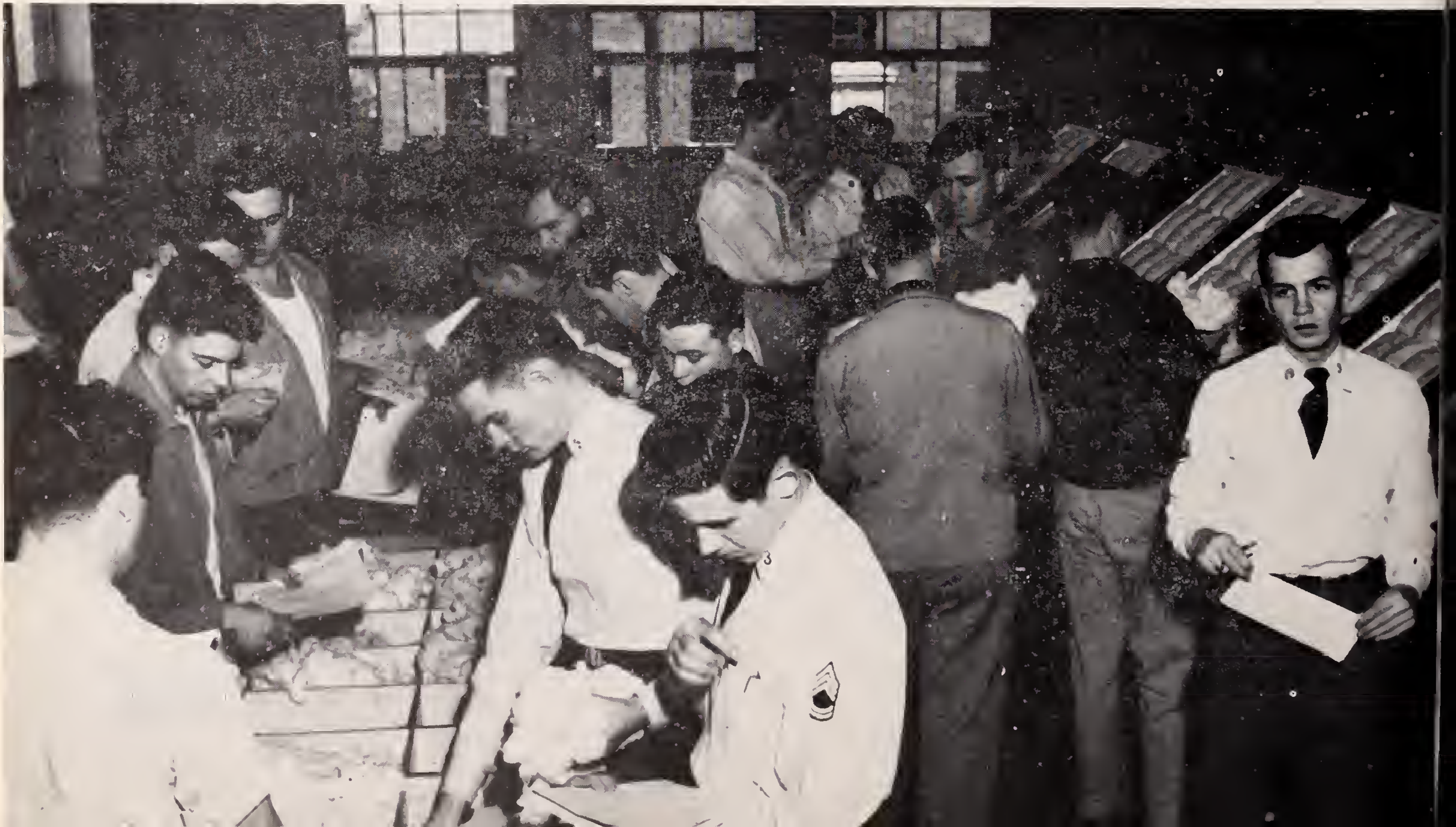
MARSHALL M. CLINKSCALES, TM '50
JOHN COTHRAN, TM '50, Photographer

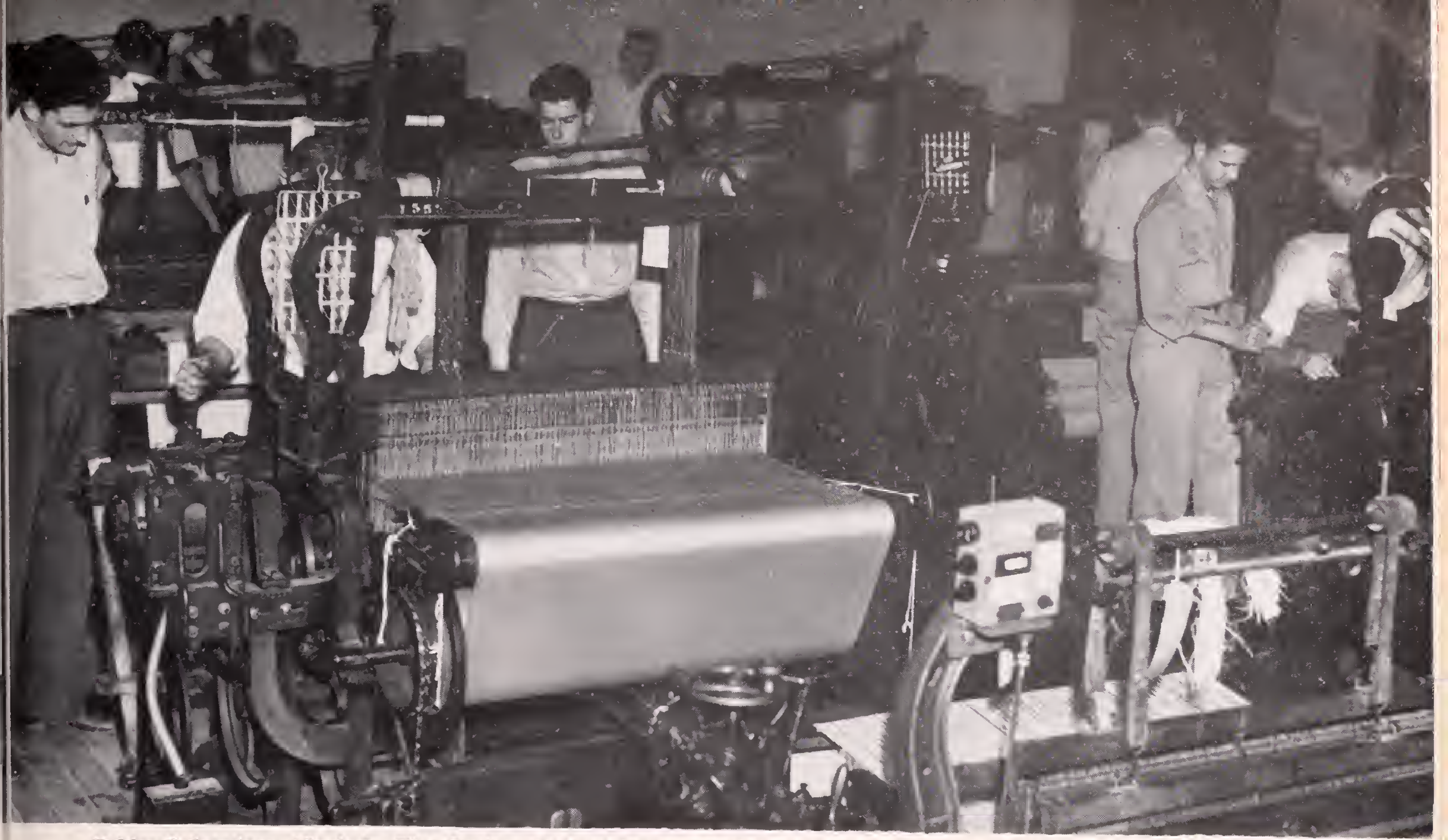
This photographic essay is designed to illustrate the content and activity of the various laboratories to be found at Clemson's Textile School. It is hoped that in this way the reader who has never visited Clemson will become more familiar with the school and its instruments of training.

Some elements of the textile education progress at Clemson have been necessarily omitted from this story. They are the Jacquard Laboratory, the Junior Dobby Laboratory, the Sophomore Weaving Laboratory, and the Textile Library.

We wish to thank the Department Heads and Professors for rendering aid in the preparation of this article.—Editor.

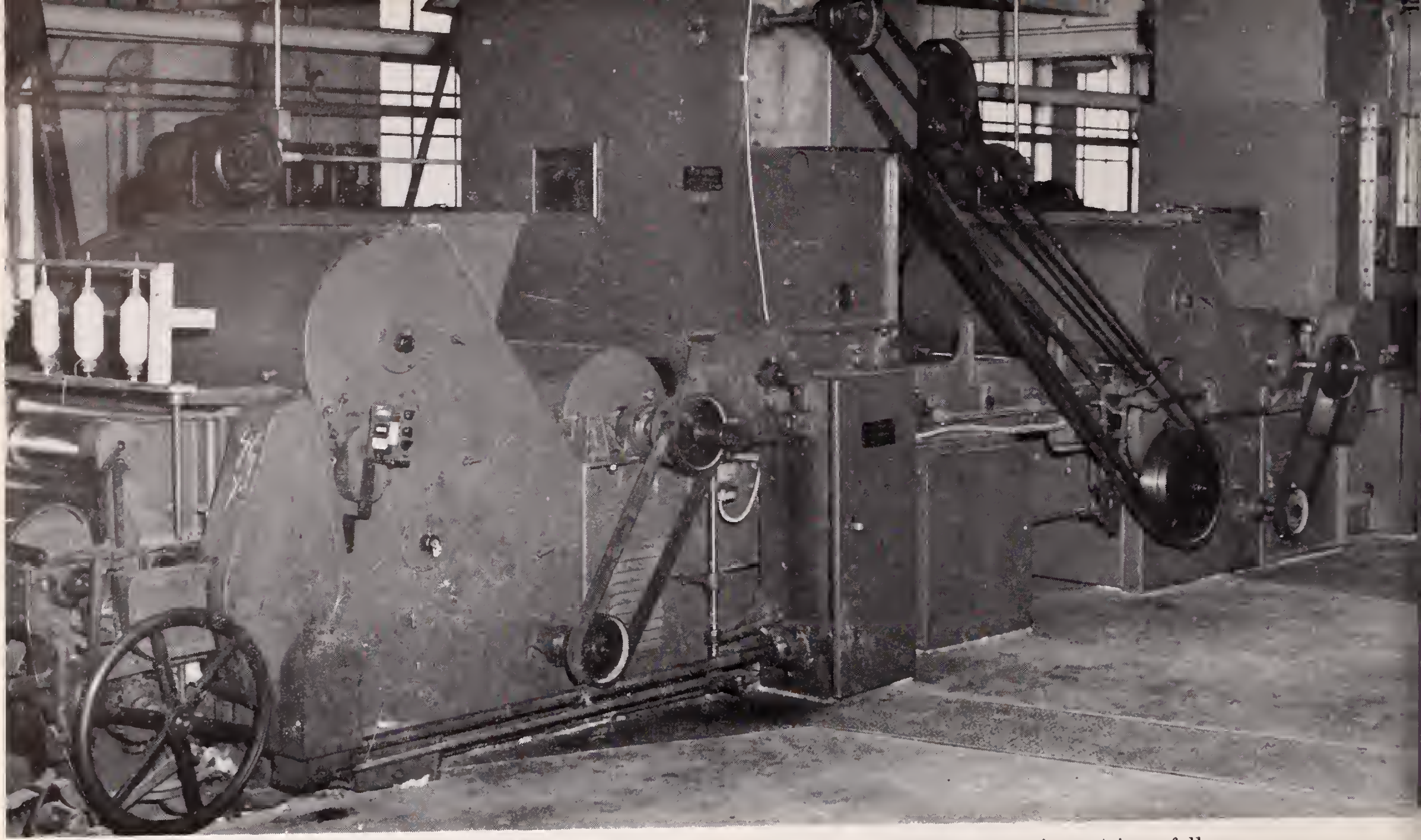
Cotton Classing Laboratory—The cotton classing laboratory is located on the top floor, the West wing of the building. The long side of the room faces North, giving an excellent light with no reflections. It is used during school session for grading and stapling cotton in the cotton marketing class, and is used during the summer by a special four week cotton classing school. The laboratory is supplied with a set of Universal Standards for grading.





Dobby Laboratory (Senior)—The Senior Dobby laboratory is used to teach Fabric Development to Senior students. Two students working as a team are required to design, make all calculations, and other data necessary for a fabric they have designed or for experimental fabrics submitted by the instructor. They are also required to tie on their own warps and make necessary adjustments on the looms so as to produce good quality cloth.

Cam Loom Laboratories—The Cam Loom laboratories contain twenty-one cam looms. Studies of the construction, mechanical operation, and adjustments of the cam loom are made. Also, analytical study of the loom, adjustment and timing of the shedding motion, picking motion, beating-up motion, gearings, speeds, and production.



Opening, Cleaning, and Picking Laboratory—In the Opening, Cleaning, and Picking laboratory studies are made of the equipment used to open, blend, and clean the raw materials, and to prepare cotton and other staple fibers for succeeding yarn manufacturing processes. All equipment necessary to perform such duties is provided for in this laboratory. Some of the equipment is as follows:

2—Hopper type blending feeders

A Vertical opener

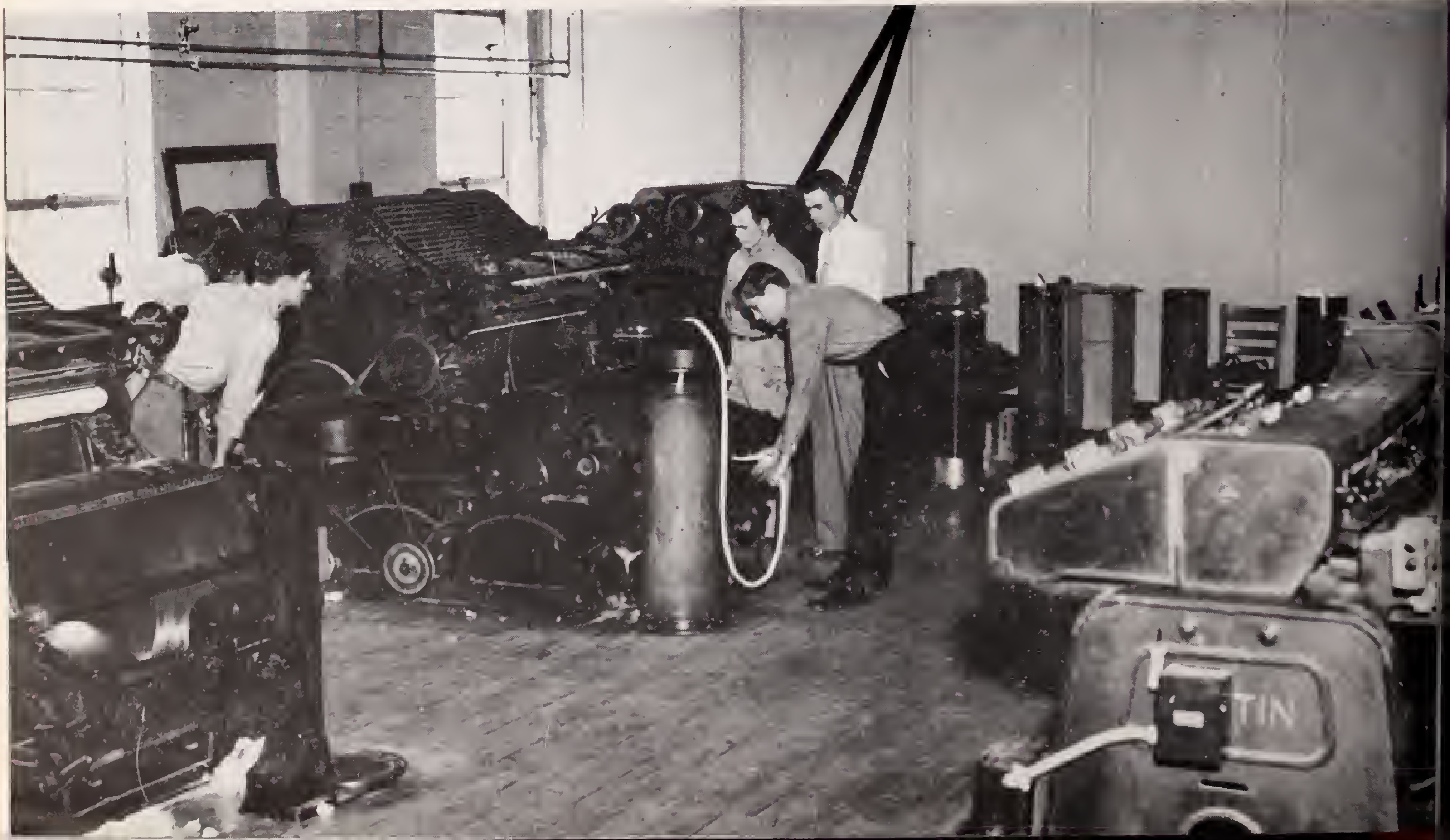
No. 11 Condensing section

No. 12 Lattice opener

Carding Laboratory—The Carding laboratory consists of the following machinery:

One roller-top card, two revolving flat cards, three conventional drawing frames, one controlled draft drawing frame, and one lap winder.

The objective of this laboratory is to acquaint the student with the carding process, which enables him to learn the primary carding procedure.

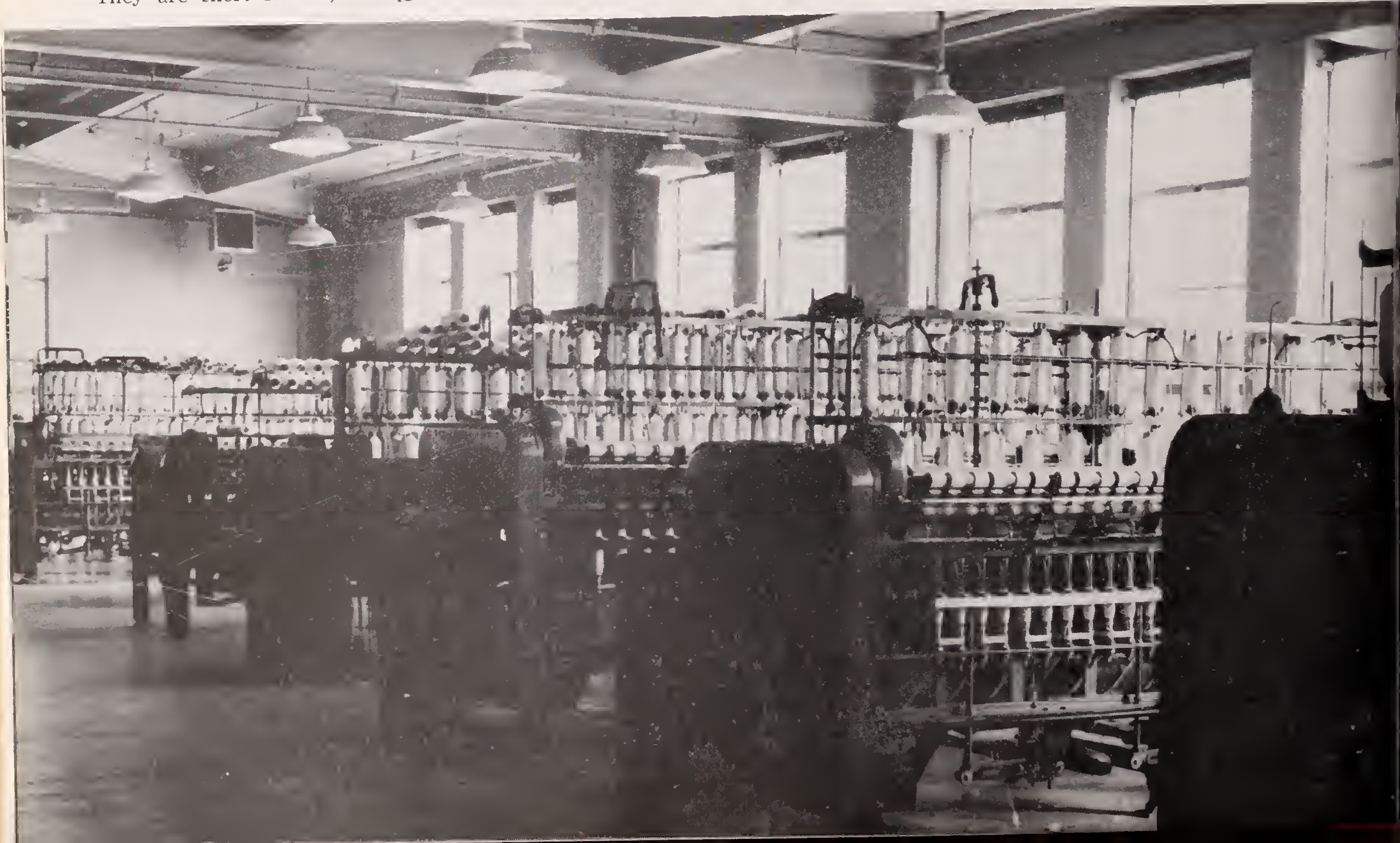


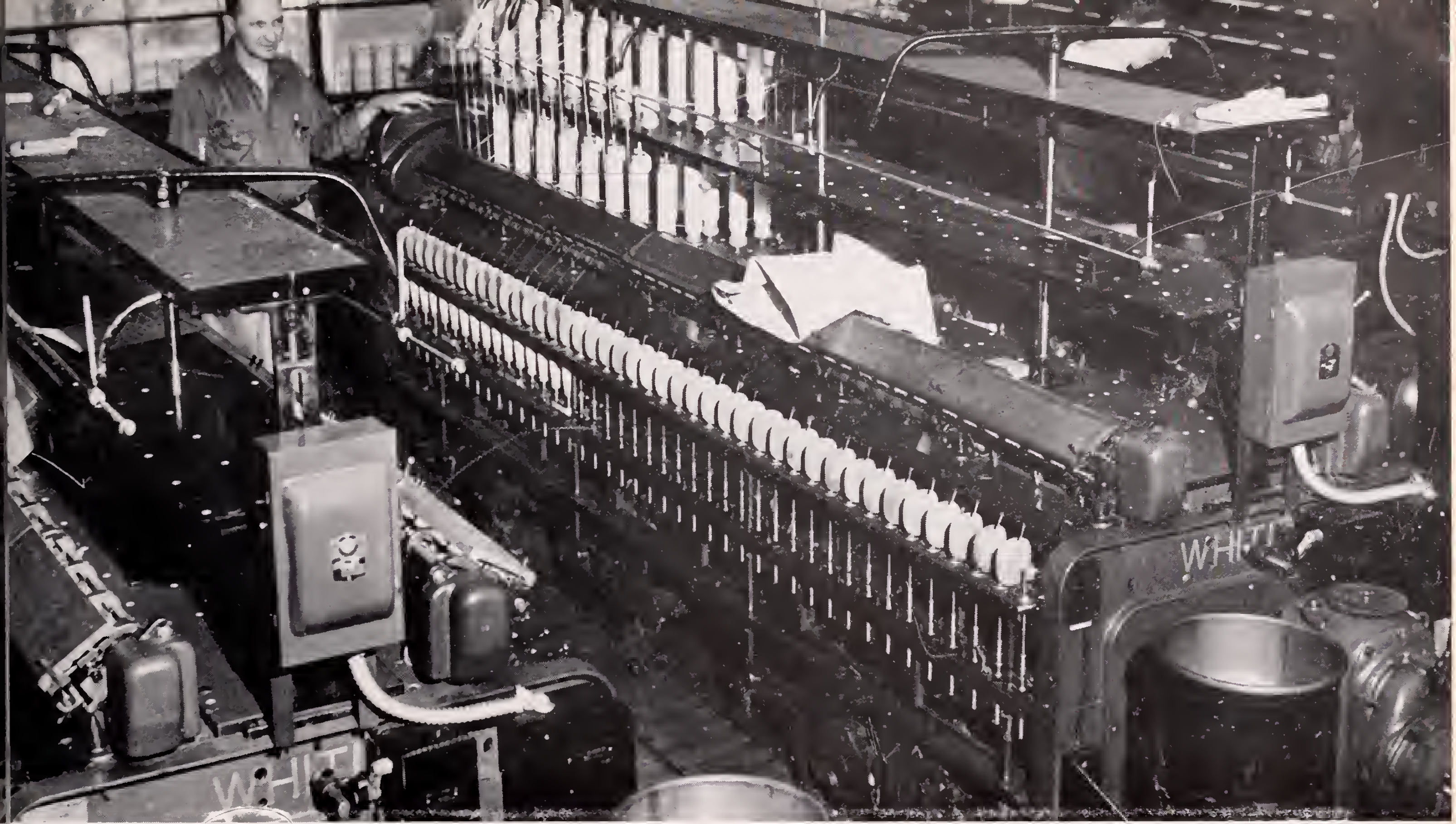
Organic Chemistry Laboratory—The organic chemistry laboratory is located in the basement of the East wing of the building. The laboratory is equipped with the usual apparatus for carrying on experiments. Various experiments which are directly related to textiles are carried out.

Microscopy Laboratory—The Microscopy laboratory is designed to train the student in the use of the basic microscopic anaylsis of textile materials. This training includes not only the mechanics of manipulating the microscope but, more important, the study of all types of commercial textile fibers. These fiber types are examined for their individual characteristic which gives the student a means of recognizing different types of fibers, an understanding of the variety of features that can be studied by a microscope, and an ability to interpret and understand magnified images. The standard chemical laboratory compound microscope is used in all examination tests, it is also the basic instrument in conjunction with the necessary accessary equipment, used in micrometry, elementary cross-sectioning and polarized light analysis.

Physical Testing Laboratory—The purpose of the Physical Testing laboratory is to give the student an understanding of the most important machines and techniques used in physical testing of fibers, yarns, and fabrics. Sample selection and a statistical analysis of experimental results, along with the applications of testing in modern textile research are stressed.

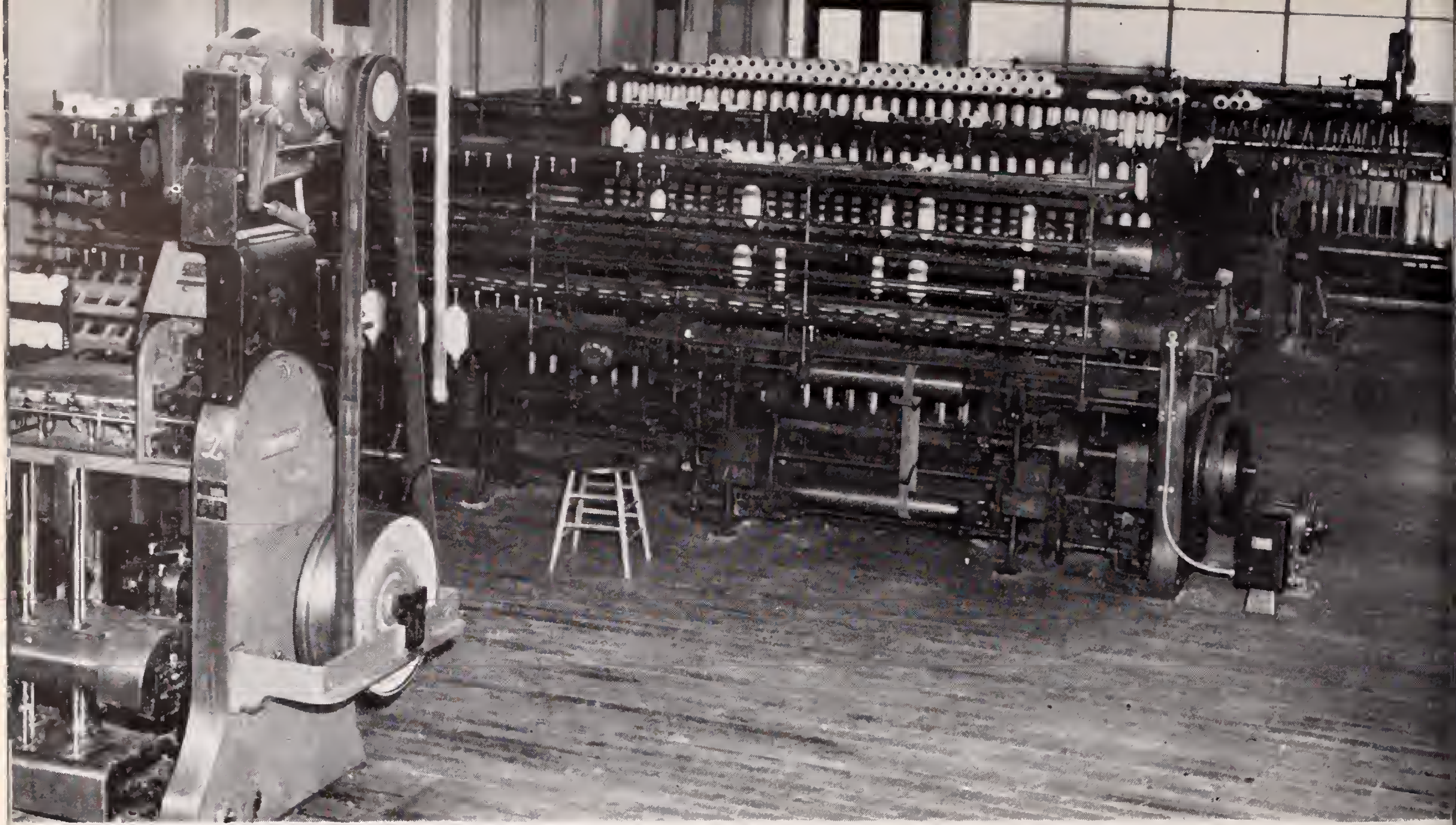
Spinning Laboratory—The spinning laboratory is used for practical instructions in spinning and twisting. It is equipped with thirteen spinning frames and five twisters. They are short frames, having from thirty-six to eighty spindles each, the short frames being excellent for instructive purposes. These frames include the various long draft systems. Sixty winding spindles complete the machinery layout.





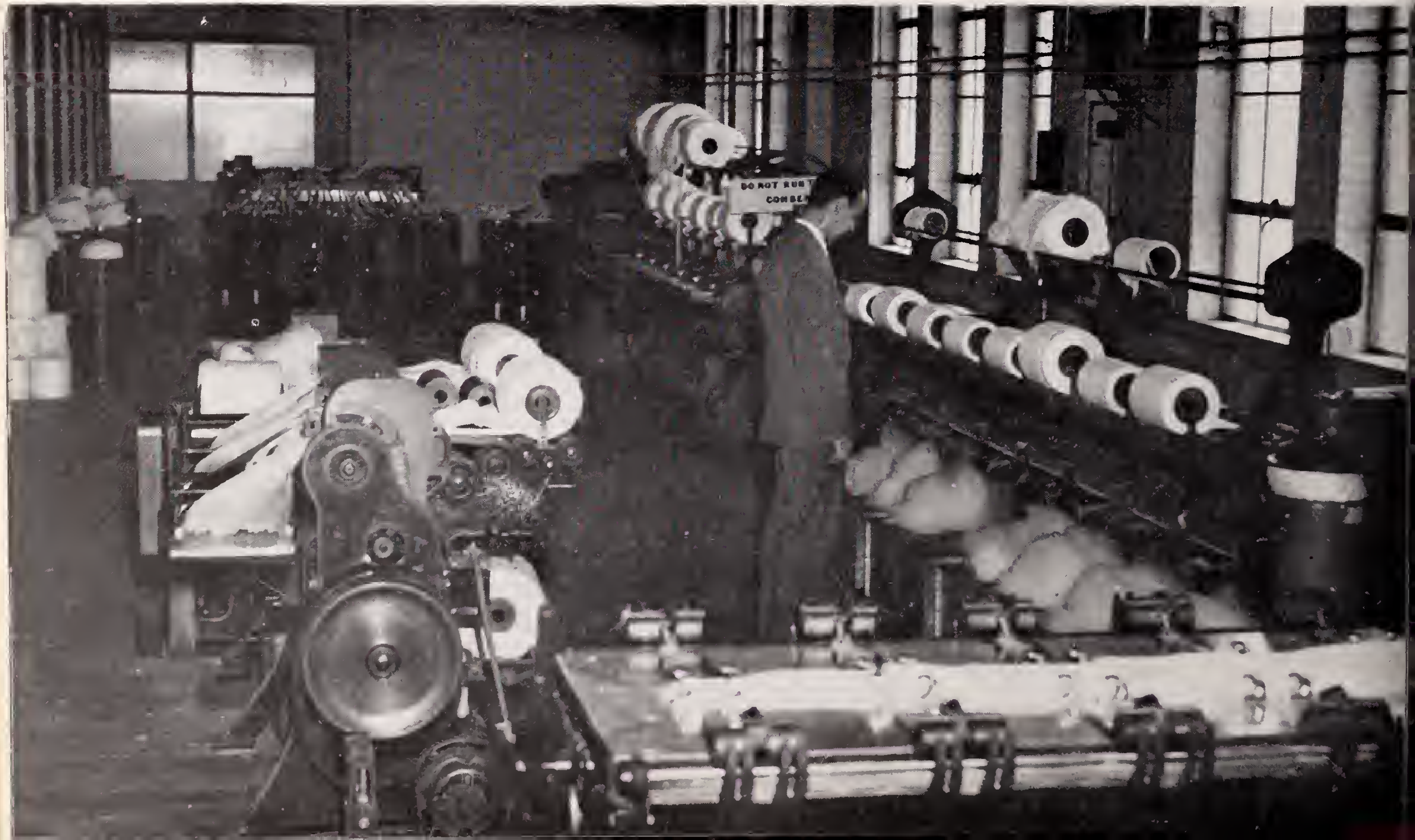
The Division of Technical Services of the American Cotton Manufacturers Institute, Inc., maintains its headquarters in the School of Textiles at Clemson College, Clemson, South Carolina. The chief function of the Division is to keep Institute members informed regarding the researches of all agencies concerned with cotton. It also maintains a modern cotton fiber testing laboratory. The purpose of this laboratory is two-fold. First, it makes available to cotton mill facilities for training their workers in all the techniques of cotton fiber testing. Second, it makes available to the mills a laboratory where they may have their cotton tested on a fee basis.

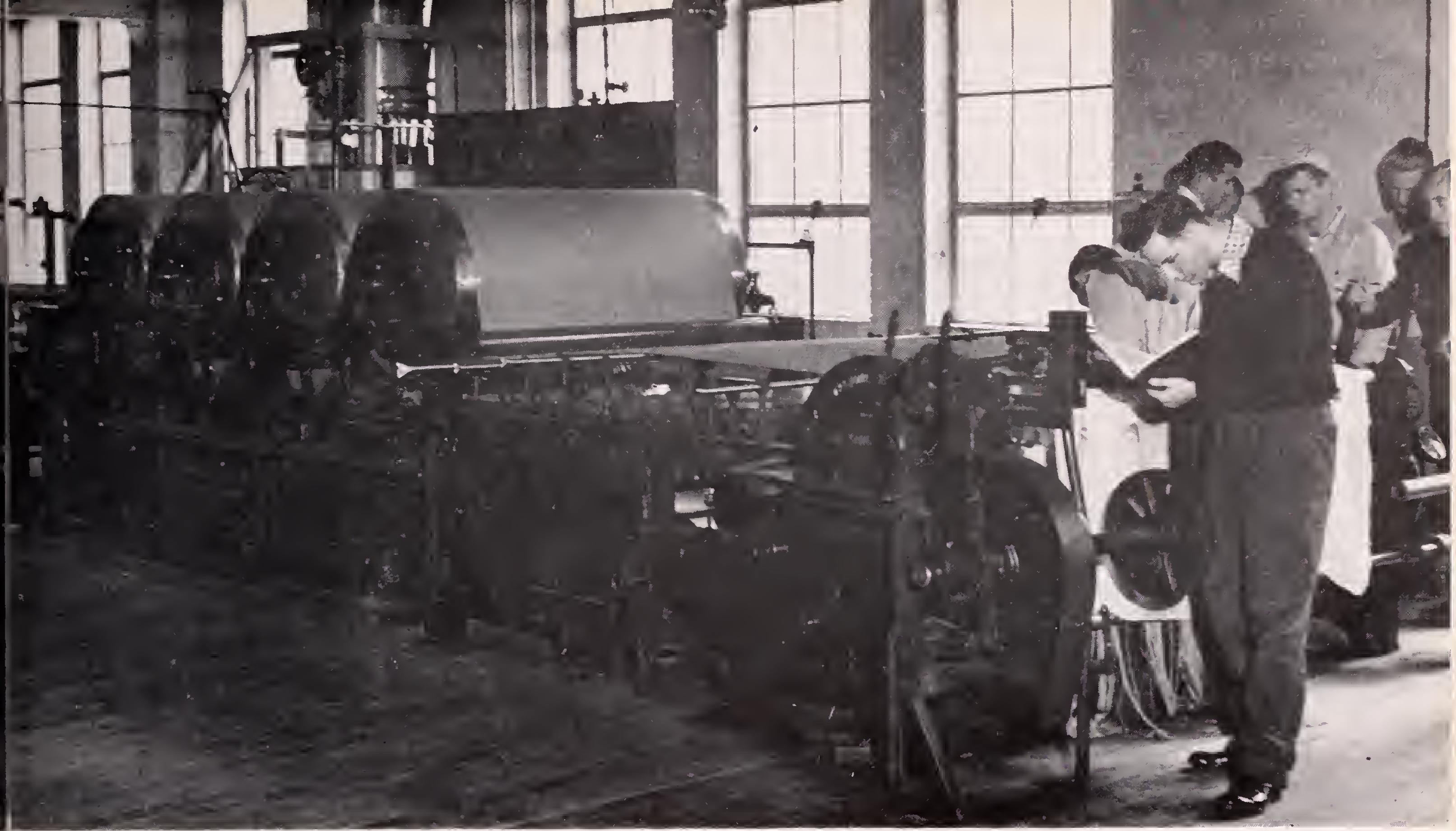
Dyeing Laboratory—The dyeing laboratory is located in the basement of the East wing of the building. The laboratory contains desks and steam baths for classes in bleaching, dyeing, printing, and finishing. Here the student actually dyes, bleaches, and prints various fabrics or yarns. Reactions of certain dyes on different fibers is observed. Studies are made of the correct procedures in dyeing.



Roving Frame Laboratory—The roving frame laboratory is equipped with seven roving frames. Three of these frames are conventional frames and four are long draft. Two of the long draft frames have been converted from their original conventional style to their present long draft status, and the other two frames are new. With this set-up, practically any combination or range of drafts prevalent in modern roving processing can be accomplished.

Combing Laboratory—The combing laboratory has all the necessary equipment to instruct the student in the combing procedure. It has a long and a short piecing comber, two sliver lappers, one ribbon lapper, and one drawing frame. By observation the student learns to readily distinguish between combed and carded sliver. Primary mechanical motions of the comber are explained, while practical experience in operation of the various machines is the objective of this course.





Warp Preparation Laboratory—The warp preparation laboratory contains new warp preparation equipment which includes a spindle-drive rayon warp and a seven-can rayon slasher. Supplementary slashing equipment includes a fifty gallon stainless steel size kettle, and beam handling hoist and carrier system.

With this equipment it is possible to warp and slash all types of yarn including nylon, viscose and acetate rayon, spun rayon, cotton, wool and blends of these fibers.

Knitting Laboratory—The knitting Laboratory is equipped with most of the machinery to give a B. S. degree in Knitting. That equipment which is lacking will soon be installed. The following machines are now on hand:

Semi-automatic and automatic hosiery machines (for both men's and women's hosiery), Body, Loopers, Hand knitting machines, Braiders, Sewing machines.

Slasher Room Controls

By JAMES R. ANDERSON, TM. '50

It was not until the late 1920's and early '30's that cotton mills in the United States turned their attention to more economical control of their production. They were, along with all other American industry, in the midst of the depression which followed the crash of '29, and were in desperate straits. They were faced with the problem of keeping their mills in operation and at the same time pinch pennys wherever they could. It was a notorious fact that mill operation was pitifully inefficient, and had been for many years. Thus, with these circumstances as a background, the scene was set for the changes which were to follow.

Of particular significance was the situation in the Slasher Room. The mills called in the various instrument companies and dumped the problem of control firmly in their laps. Their directive was: Give us better operation of the slasher, and give that to us at a lower cost.

Immediately the question arises as to just why the slasher was chosen for such concentrated effort. The reason is apparent. As the old adage states, "As goes the slashing, so goes the weaving." Neither the slashing operations or the weaving was satisfactory as far as the mills were concerned.

Various instrument companies accepted the challenge, and they rolled up their sleeves and embarked on a period of trial and error in an effort to bring about some improvements.

They began with the size cooking kettle. The mixing of the size generally takes place around 80 degrees F, but under the old conditions, it was found that not all was going into solution even then. So, air was introduced under pressure to help break up the lumps.

It was also discovered that there was a Critical Point in the cooking of size at a temperature of about 180 degrees F. The control of the kettle from the mixing temperature of 80 degrees F to about 160 degrees F is relatively simple, and the temperature can be raised as fast as desired.

However, from about 160 degrees F to 190 degrees F, in the critical zone, control is very important. All starch is made up of little grains and it reacts to heat just as popcorn does in the kitchen of your home. We have all seen the "popping" effect of this delightful food when we hold it over the heat and it suddenly begins to pop and expand considerably.

So it is with the starch used in the slasher room. In order to make the finest possible size, which has the smoothest quality and is the most viscous, the starch mus "pop." In so doing, it absorbs more water, and completes the mixture This takes place at approximately 180 degrees F.

It was further discovered that if the temperature in this zone is raised too fast, not all of the starch will pop, and even by lowering the temperature and again raising it to the critical point, the remaining starch will not pop. In other words, the critical point can be reached once, and only once. After it has been passed, there is nothing more that can be done.

Here was the point where the mills were having the most trouble. They were not deriving the full value from their mix and consequently the size which was put on the warp was rough and not uniform. This caused bad weaving. All too often size was mixed merely on the experience of the men in the slasher room. They, like anyone else, were not accurate enough to be able to properly control all the mixing elements.

Therefore, the first step in the modernization program was to devise a control for the mixing operation. A timing-cam was subsequently designed that would fit the cooking schedule for the particular mill concerned. This controlles the amount of steam entering the kettle by means of a valve. When the temperature reaches the critical point, it remains relatively constant. Here, the corn starch pops, and it is also at this point where a great amount of steam is necessary to insure the complete popping of the starch mixture. Previous to the days of timing controls, this step in the mixing process was where the least amount of error on the part of the slasher men would ruin the entire batch.

As the starch begins to pop, the steam valve opens slowly at first, then rapidly until for the first time, it is wide open. It is here that the full steam pressure is necessary, as the actual popping operation requires a great amount of steam. At this point, even though the steam is entering as rapidly as possible, the actual size temperature remains relatively constant—at approximately 180 degrees F. As long as the supply of steam is adequate, the popping takes place and upon completion of the reaction, the additional steam entering will continue to raise the temperature of the size mix to above 200 degrees F., where it cooks for about one and one quarter hours.

From here, the size mix goes to the storage kettle until ready for use. Controls were applied here, too, as lack of proper attention at this point had caused much trouble in the past. The investigators concluded that, having gone to much trouble in preparing the size compound, it was expedient to give every precaution to the compound in each step that would follow until the size was actually on the loom and weaving cloth. If the cooked size were to be placed in an uncontrolled kettle, its temperature would vary with the necessity of reheating at the size box. This would tend to partially destroy the desired characteristics which were so carefully controlled in the previous operation. Wet steam used in the size box would dilute the mix, it would lose some of its desired viscosity, and the resulting weaving would be bad.

As a result of this, a control was produced to maintain the storage kettle at the specified temperature. At the same time, two outlets were installed in the kettle, one at the bottom, and the other two inches above the closed coil. This latter opening was connected directly to the size box on the slasher and by its location insured that the level of size in the kettle would never get below the coil itself. If this were to happen, the size would tend to bake onto the coil, and eventually become so thick as to form an insulation around it. The bottom opening is a drain used only when emptying the kettle and for washing purposes.

From the storage kettle, the size is then ready to be applied to the warp yarn passing through the size box. Controls here maintain the level of the size in the box, and its temperature at a constant point. The temperature control is particularly important as the viscosity of the size will vary tremendously with a small change in temperature. Constant viscosity, of course i,s the determining factor in the amount of size that penetrates the yarn and that, after all, is its primary purpose.

The final, although none-the-less important step, is the temperature in the multiple cylinder type slasher. There is a marked variation in the drying qualities with a variation in temperature, and uneven temperatures would give many headaches in weaving. The two types of temperature controls commonly in use are by steam, and by the condensate in the cans. The former type, using the temperature of the steam as a measure of the can temperature, is not as accurate as the condensate, as steam will not indicate the slight variations as quickly as water. And it is not surprising, then, that instruments which make use of the condensate are becoming more popular and satisfactory in most mills.

When the steam enters the can, it will eventually condense into water and settle at the bottom. This water, or condensate as it is called, is drawn off through the condensate line, and passes around a bulb, which is the instrument of measurement.

There are several types of bulbs used, the vapor type being considered the most satisfactory because it gives the most accurate reading and the quickest. For example, a mercury filled bulb will take 13 seconds to record a 3 degree change of temperature. Using gas in place of the mercury, the same change is shown in 9 seconds. With a vapor, the time is only 7 seconds.

Mercury and gas have a uniform rate of expansion. In other words, the equation of both would be a linear type, which gives the same distance between increments at any point on the graph. Thus, the readings at one point are no more accurate than those at any other point. Vapor, on the other hand, is not linear in its rate of expansion. At points near the bottom of a tube of vapor, it is highly compressed. However, as the graph rises, it indicates that the density decreases considerably. This means that with higher temperatures, more accurate readings can be made. Thus, as used on the slasher cans, closer control and finer adjustments can be achieved.

The bulb thermometer, then, is constantly indicating the temperature of the condensate as it comes out from he cans. When that temperature drops below a predetermined point, it is an indication that the can is cooling off, and more steam is admitted until that condensate reflects the change.

Each condensate line is an independent unit, regardless of the number of cans on the slasher, so that changes in one unit do not effect the others.

The heating of the cans is an important step, and one that can cost money in the waste of steam if not properly controlled. Before the steam is turned on, the cans are full of air. As the steam enters, the air will attempt to find an outlet, and if there is no means of handling this air, it will remain in the cylinders and act as an insulation. Eventually, it will find its way clear through the steam traps, but the big problem is to remove it quickly. Under such an arrangement, there will still be a thin film of air left which will act as a barrier to the transfer of heat to the drying surface.

Similarly, water logging can result if but a single steam trap is used for all the cylinders. This accumulation of condensate causes uneven drying temperatures, increased steam consumption, and a general reduction in effeciency.

By the use of special thermostatic air vents and draining system for each cylinder, the initial heating time has been found to be much less than before. These fully automatic units continue to function at all times, and help to keep a constant flow of condensate and air from the cans during the entire operation. As a result, the overall costs of operation are reduced and a more uniform product results.

By the time the warp on the slasher has passed over the last can, the process is complete and the yarn is ready for the weave room. So it was that better operation was achieved in the slasher room. The changes and procedures noted briefly in this discussion have been some of the more important improvements that have been affected. They have been made only after a great deal of study and research by many men, and the results have more than repaid the mills who have made use of them. But the trend has not stopped there. Each day new ideas are developed which will better serve the efforts of mill operators in their goal to produce a better product at a lower cost.

RALPH E. LOPER COMPANY

Specialists in

TEXTILE COST SERVICE
INDUSTRIAL ENGINEERS

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PHI PSI

Iota chapter of Phi Psi assembled one night during the last week in March to record for posterity the distinguished array of members pictured above. Included in the portrait are the sixteen new pledges who qualified for membership in the recent elections held by the chapter. As is the custom, the "Worms" represent all phases of the textile cirriculum, and have distinguished themselves in scholarship, character, leadership, and personality.

Brother Harold Hart, Executive Secretary of Phi Psi, and distinguished figure in the state of New Hampshire, visited Iota chapter for a few hours in February of this year. He was entertained at a dinner in the Poinsett Hotel in Greenville, South Carolina, at which time such topics that pertain directly to the fraternity were discussed at great lengths.

ANNUAL CONVENTION

Phi Psi held their annual convention on May 5, 6, 7, 1950 at the New Ocean House, Swampscott, Mass., and the Clemson chapter has, for the last several months, been busy working on the projects which were displayed there.

GREENVILLE ALUMNI CHAPTER

On Friday night, March 31st, of this year, three of the active chapter members and two faculty members of Phi Psi exchanged ideas with several Greenville alumni members of the fraternity about the reactivation of the Greenville Alumni Chapter of Phi Psi.

Through the efforts of James R. Anderson, chapter president, and Foster Cathcart, and Marion Kirby of Iota chapter, and Professors A. E. McKenna and T. A. Campbell of the textile school, the group met with Brothers W. R. O'Shields, John Shell, and Gordon Williams of Judson Mills, and W. K. Stringfellow of Dunean Mills for dinner at the Poinsett Hotel in Greenville.

The general theme of the conversation centered around the number of Phi Psi men in Greenville and vicinity and how to best go about contacting them for the purpose of reactivating the Greenville Alumni chapter. The chapter has not been active since shortly before the War, and it is felt that there is a great need for such a group. The interest shown by the alumni present was gratifying. They have all agreed to make as many contacts as possible in the next few weeks, and all Phi Psi men are urged to contact the Clemson Chapter simply by returning the coupon below. Clemson will act as a clearing house for all the names received and, if it is found that there are other groups outside of the Greenville area, it will be possible to suggest the formation of other alumni chapters. It was decided to wait until the Fall before going ahead with any definite plans, but all members are urged to contact the school immediately so that plans can be worked out.

Return to PHI PSI FRATERNITY,
Textile School, Clemson College,
Clemson, South Carolina

Name ______________________________

Address ______________________________

City ____________________ State ____________

CLEMSON AATCC ACTIVITIES

The Clemson College student chapter of the A. A. T. C. C. is a student affiliate of the national organization of the American Association of Textile Chemists and Colorists. The National Organization is made up of men and women in the textile field, or in any allied branch of textiles, whose objective is to aid in the advancement of textiles through applied chemistry. Through their affiliation with the National Chapter, the student chapters are urged and encouraged to participate in various types of contests, research while in school, and in selecting suitable problems for thesis work. Due to the limited amount of time a student has to apply to such work while in school, the research problems so designed are not too extensive.

If the work being done by a student is considered to be of great importance, the work is sometimes carried over for the next graduating class. This has happened quite often at Clemson.

The members of the Student Chapter receive the "Dyestuff Reporter" twice a month. This magazine covers all the current news and development in the field of Textile Chemistry. In addition to these two publications a month, each member receives a yearbook once each year.

In order to become a member of the Clemson Chapter of the A. A. T. C. C. a student must be a Textile Chemistry major, must be at least a sophomore, and must have completed his work in analytical chemistry. Upon graduation, student members automatically become Junior members in the National Organization.

Each year the outstanding senior who has done the best work in Textile Chemistry is awarded a prize plus a year's subscription to the National Organization of the A. A. T. C. C. This award is made by the Clemson Chapter of the A. A. T. C. C. to publicly recognize such achievement and to further encourage work of such calibre.

——BOBBIN AND BEAKER——

ASTE NEWS

The American Society of Textile Engineers has recently received a number of replies to the information blanks which were mailed to textile engineering alumni. It is gratifying to note that most graduates are interested in the recently sponsored Alumni Bureau which enables the Textile School to maintain contact with its textile engineering graduates. Specifically, this bureau is a file of up-to-date addresses of textile-engineering alumni. From past experience, it has been found that quite often prospective employers come to the Clemson campus or write to the Dean's office for the purpose of seeking men who have had some experience in a given field. With the presence of the bureau, it will be more likely that these sought after men will be placed.

Much interest has been shown in this textile engineering society from other schools such as Lowell Textile Institute, Alabama Polytechnic Institute, and Georgia School of Technology. Consequently, a constitution is now in committee which will be applicable to a national organization similar to the local society. This constitution, when completed, will be presented to these interested schools in the hope that they will form their own engineering socity.

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TEXTILE RESEARCH AT CLEMSON

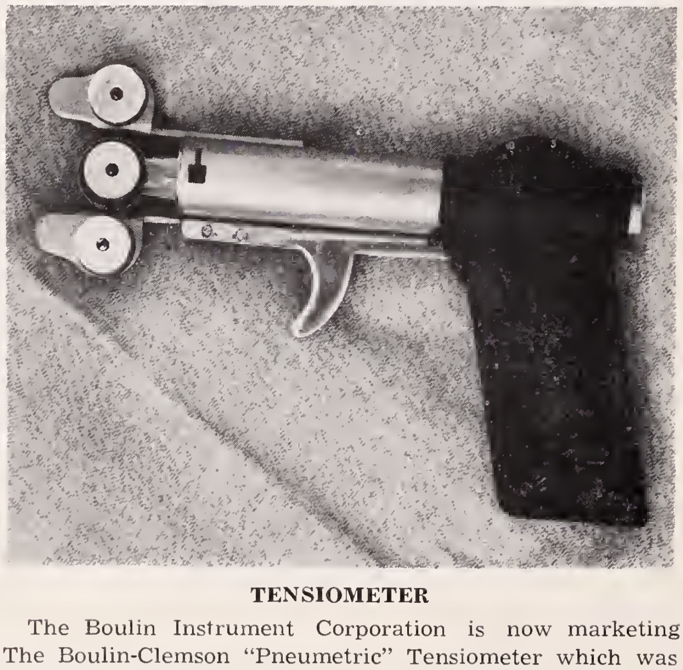
(Continued from page 15)

An air-flow instrument has been designed at Clemson by Dr. H. M. Brown and experimented with by Professor J. S. Graham. If promises to be superior to some other instruments for measuring specific surface area of fibers. The instrument consists of a simple constant-pressure pump and timer system, whereby a stop watch automatically records the time-of-fall of a piston falling due to gravitational pull, moving a fixed distance and thereby displacing, under constant pressure, a definite volume of air through a porous media having fixed weight and volume. This rate of air flow has been found to be inversely proportional to the specific surface area of the fibers in the wad. The advantages of this Air Flow Instrument over other models are: (1) It is simple in design, (2) easy to move about, (3) requires no motor or pressure line connections,(4) gives an absolute rate of air flow through a fixed plug of fibers, rather than a reading which must be interpreted by means of a calibration curve.

FIBER STRENGTH TESTER

Another important deelopment in the Clemson Textile Department is the Fiber Strength Tester designed by Dr. H. M. Brown which is a constant rate-of-loading fiber strength testing machine to be used for testing a flat bundle of fibers. The gauge length of the specimen is adjusted.

The machines available at the present time for testing fiber strength give variation in rate-of-loading of the specimen and also produce varying inertia errors. The machine designed at Clemson is expected to reduce these above mentioned errors, and in addition makes an automatic recording of the results.



TENSIOMETER

The Boulin Instrument Corporation is now marketing The Boulin-Clemson "Pneumetric" Tensiometer which was perfected in our textile department. To operate this tensiometer the trigger is drawn thereby retracing the two outer pulleys so that yarn may be centered in the pulleys. When the trigger is released the outer pulleys place tension on the yarn. The dial which was set on zero is now adjusted so that colored index in the window of the barrel will be exactly parallel to the vertical line on the barrel. The reading may be taken with yarn laced around the pulleys or after the trigger is drawn and the yarn laced around the pulleys or after the trigger is drawn and the yarn removed, as the indication on the dial does not change until manually altered. Another advantage of this instrument is its ability to hold any predetermined tension setting for the purpose of checking against yarn tensions, in which case the indication will be simply in terms of "correct" or "incorrect" tension. The Boulin-Tensiometer may be used in places where readings would be difficult to obtain with other Tensiometers. The present model has a range of 0 to 100 grams.

IN CHEMISTRY

A number of experiments are being conducted by the staff and students of the Textile Chemistry Department.

(1) Experiments with nylon in an attempt to get dyes of better fastness.

(2) Methods to improve the color fastness in cotton hosiery.

(3) Working on a quick method of detecting honeydew (a sweet liquid excreted by most aphids on cotton which becomes gummy on the cards causing the fibers to run badly and resulting in very neppy goods.)

(4) Continuing the study on viscose and acetate fibers beyond the point that was reported at the National American Association of Textile Chemist and Colorist last fall at Atlantic City. (Note: The paper, by Dr. J. E. Lindsey, on this subject won one of the prizes in this National Convention). The results obtained from nylon dyeings looks very promising and will be reported at the Spring meeting in a paper of The Piedmont Section of the American Association of Textile Chemist and Colorist.

VARIETIES OF COTTON TESTED

The farmers, breeders, and textile men of South Carolina may be interested to know that Mr. R. C. Hendrix has run some tests on samples of cotton taken from winners of the five acre contests in which 41 counties of South Carolina was represented. Fourteen ounces of each sample was run through the picker, card, drawing, roving and spinning frames under normal operating conditions producing three counts, 22's, 28's, and 36's. The yarn breakage strength and general appearance test were then made and submitted to the Department of Agriculture for future studies which should be of value in that it would:

(1) Give a research worker a base for setting up a program to determine variations in quality of cotton grown in each county.

(2) Important to cotton buyers in that it would be of a benefit toward selecting the cotton most suitable for a particular fabric.

(3) Aid the farmer in choosing the variety of cotton most suited for the local area.

The most significant phase of this experiment related to the textile industry was the processing of such a small amount of cotton under normal conditions and being able to make these tests. Professor Hendrix is planning to write an article on the technique that was used and problems encountered.

FIBER DENSITY PROJECT

Methods used in the past for determining the density of fibers all require a great length of time and run into a rather high cost. To overcome these difficulties, a Fiber Density Project is now being conducted by Professor C. V. Wray of our Textile School. The following remarks make up a short outline of the work completed and are by no means complete.

The first objective was to find the best wetting agent for cotton that would not cause bubbles to cling to the fibers. Several agents were tested with cotton samples and Victawet was found to give the best results. Cotton samples were then allowed to condition under standard testing conditions for a period of fifteen hours. The weight of the cotton sample was taken before and after placing same in the wetting agent, making a correction for the weight being taken in air before placing in the wetting agent. The weighing of the cotton sample was made while in the agent and at different intervals and the density indicated was found to change with time. Based upon the change of density of the samples with time it was decided to try purified cotton samples in the Victawet to see if with impurities removed, the density reading would remain more constant. Several tests proved that even with purified cotton the apparent density changed with time when placed in the wetting agent. Then methyl alcohol followed by distilled water was used both with regular and purified cotton samples, but again there was variation with time. Next butyl carbinol was used as the liquid in which to weigh the samples and it was found that the density remained rather constant but still not as much as was desired or thought to be correct.

It was then decided to run special variety samples through a Shirley analyser before placing them in butyl carbinol for the density weighing test. At this time not enough of these samples have been run to give an accurate answer as to what the results are going to be but if such a method is developed it will be of value to cotton breeders and to mills in determining the cellulose content of cottons.

CARDING

Professor T. A. Hendricks has been doing research on the roller top card to determine which direction the workers should rotate. The stock used in this experiment was 1 9-16" staple, 1 1-2 denier cut acetate which is one of the synthetics that commonly has the higher fiber breakages and usually has a higher nep count. This study was made with an average from 5 to 38 pounds per hour with the workers turning clockwise and then counter clockwise at each time the production gear was changed. Professor Hendricks first attempted to make his study by determining the nep count but the card was set up to Laco-Lowell's recommendations and no neps were made. Then he decided to make the experiment on the principle of fiber breakage under the same conditions as listed above. The results of this experiment indicates that the direction the rollers rotate does not affect the breakage of the fibers. The stock was then run through the drawing, roving and spinning processes and was reported to be of good spinnability.

MINIATURE SPINNING

A principle of Miniature Spinning which would enable

(Continued on page 30)

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TEXTILE RESEARCH AT CLEMSON

(Continued from page 29)

the cotton produced from a single plant to be processed and the yarn subjected to various tests is being conducted by Professor J. H. Marvin. If perfected, it would make it possible for a cotton breeder to test the cotton from single plants of different varieties of cotton to determine which was best suited for a particular soil or specific use in the textile industry. For this experiment, 120 grains of cotton were run through the card, drawing, roving, and spinning frame, with colored stock being used for piecing up to reduce the amount of waste to the sample. It required one and one-half hours to run this sample.

The breaking strength and general appearance compare favorably with yarn run under normal conditions. Many obstacles were encountered and a number of improvements on the feeding and delivery techniques are to be made.

X-RAY STUDY

Dr. A. N. J. Heyn has been experimenting with small-angle scattering of x-rays to study the micellar structure in cellulose fibers.

In addition to the research on diffraction and scattering of x-rays at small angles, Dr. Heyn has made a study on the relationship of wax content to maturity of cotton. The wax content method may be carried out with a small amount of error but it has the disadvantage in that it requires a considerable length of time to make the test.

NEW TEMPLE

The Textile School developed a new temple that works on an entirely different principle. This new temple has been used on spun rayon sheeting that is very hard to hold without damaging the fabric. Further experiments are now being made by a machine company and we are looking forward to having more information on this in the near future.

Professor R. C. Lathem has been experimenting with the processing of 100% ramie on the standard cotton system but as yet there are no results available and more studies are being made on this subject.

WAVE EFFECTS ON PHYSICAL PROPERTIES

Professor L. H. Jameson has been making a study of the effects of different weaves on the physical properties of rayon fabrics. The weaving of these fabrics were made under standard conditions, using 150 denier filament rayon for both warp and filling, with an 88 by 80 construction. This experiment was limited to weaves completing on eight harnesses; such as, regular twills, broken twills, basket weaves, rib, honeycomb, granite and combinations of the weaves listed below. A total of fifteen samples were subjected to the following test of both filling and warp (1) breaking strength, (2) elongation, (3) take-up, (4) shrinkage, (5) tear resistance, (6) fabric assistance, (7) weight and ounces per square yard. Each weave was classified as to texture and surface characteristics (1) open and close, (2) firmness and sleazy, (3) long floats and short floats. Warp tension and other conditions were kept constant for all the weaves. Results and conclusions are not available at this time as other studies are being made.

Compliments of

ABBOTT MACHINE COMPANY

Wilton, New Hampshire

Experience Is **NOT** The Best Teacher

(Continued from page 5)

ing system and contaminated the entire soft water supply with Aluminum. In the soap fulling operation sticky insoluble Aluminum soaps were deposited upon the cloth which produced streaks when dyed with the usually level-dyeing acid dyes.

Armed with this information, we emptied the entire process water system and refilled it with fresh pure soft water. Then we dumped and thoroughly cleaned every soap storage tank in the mill. Production was then resumed as usual and there were no further signs of streaky piece dyes in that mill.

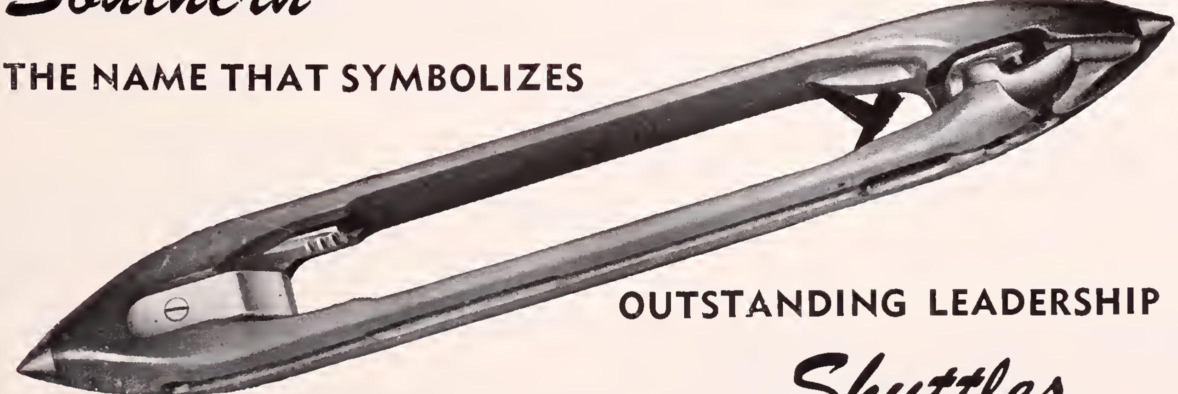
The dyer would have lost his position in a few more days if the cause of the trouble had not been located, though it was not his responsibility at all. In this case the use of Sodium Aluminate was resorted to by the Chief Engineer because several barrels of it had been in stock for years and never used. This took place when management was trying to work off inventory at year end to save further expenditure.

In another instance a large Southern manufacturer of cotton yarn suddenly found that they could not dye their regular lines of direct cotton yarn dyeings without getting some tendency to unevenness where none had been regularly noted before. The condition had been encountered in the past, but always in a mild form and always seemed to disappear after a time. Consequently they simply tolerated it assuming they could not find out what the cause might be. The streaked or stained yarn was always redyed Black and sold as quickly as possible, usually at a slight loss. However, a particularly bad epidemic appeared while this writer was present on another matter so we rolled up our sleeves and went to work. Analysis of the stained yarn, in their own laboratory, disclosed considerable quantities of calcium and magnesium. Analysis of the undyed yarn did not show this result and neither did the water nor any other ingredient that went into the dyebath, including the dyestuff itself except the salt. The salt that was used did show unusual quantities of both calcium and magnesium. Therefore, we repeated the worst offending colors replacing the salt in question with salt that was free from both Calcium and magnesium.

Although several years have passed since then, no further streaks or stains have been encountered. In this case the Calcium and Magnesium present in the salt combined to form a sticky insoluble compound with the boil-out oil used in the boil-out, since the boil-out bath was subsequently used as the dye bath.

In still another instance a woolen blanket manufacturer was having a great deal of trouble with filling streaks in his all-wool piece dyed blankets and asked for outside assistance to correct it. In this case there could be no question of mixed fillings or warps because this mill ran on one wool blend for both warp and filling. The whole mill ran on it. Our suspicion was aroused when we saw them steaming small package mule bobbins and large package frame bobbins in the same box. Reelings were taken from the small bobbins and from both the outside and inside of the large bobbins. These reelings were dyed together in

(Continued on page 32)



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Experience Is NOT The Best Teacher

(Continued from page 31)

the same beaker, to the same shade as they used on their blankets, and the same differences were readily apparent between the yarn from the small bobbin and the inside of the large bobbins. The mill discontinued steaming, found that they could weave with no additional trouble, and their filling streaks stopped completely.

INDUSTRY DOES NOT USE OWN KNOWLEDGE

Difficulties such as the above can be related without end. They occur day in and day out. All of these cases were serious to the plants involved. However, they are only cited here to point out and to illustrate the thought that industry does not use the simple tools at its own disposal, before calling for out-side help. No imagination was needed to run down the gremlin in any of the cases given. The only requirement was an open mind and the effort of common sense over a few days, at most, and the answer was as clear as crystal.

In this connection it seems to me that it is of great importance that the technician should not underestimate his own ability. He can do anything, if he will only do it right. The fact that a certain operation has been conducted for fifty years in the same way is the best argument there is for thinking up a new method. One should always be on the alert to shorten and improve methods and one who is not bound by the rule of practical experience is in a good position to try something new and different, provided his theory is sound.

It has been demonstrated over the years, that very proficient technical people have often neglected to claim the financial remuneration that the quality of their services seemed to warrant. Having that in mind the technical graduate should never forget that he is "in business" in his chosen scientific field, just as much as though he were a sole owner of an establishment. He is selling his services. He should be jealous at all times to see that the quality of his work is superior to that produced by others. But, after demonstrating superior ability he should not fail to claim commensurate reward. At the same time it is well to start out with the knowledge that management has problems. One of the important problems is to "maintain salary schedules" which is another way of saying "Hold the line."

However, it should be distinctly understood that "holding the line" is not the problem of technical personnel of superior ability. Management knows very well that the salary cost for superior men is not a fraction of the cost for men of lesser capabilities. They have to be prodded, but they pay.

"KNOW-HOW"

This calls to mind the case of a dyer acquaintance, now deceased. He was called to a carpet mill to dye a particular shade of grey that no one had so far been able to produce, in a time when salaries and wages were far less than now. The manager gave instructions to dye one 500 lb. batch.. When it came out satisfactorily he asked to have another 500 lb. batch dyed. The second lot also came out as desired, whereupon he asked for the bill. My friend said "One hundred dollars." At that point the mill manager nearly exploded and exclaimed "Itemize that bill!" The friend called for a sheet of paper and itemized the bill as follows:

"For dyeing two batches of wool yarn	$ 5.00
For knowing how	95.00

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Do not forget to keep your eye on the value of "Knowing How."

Naturally no employer is going to pay extraordinary prices for ordinary results, but I will venture the thought that anybody who produces extra fine results and goes to his employer for a raise will get it. If such a request were refused twice the only logical procedure would be to make a change because it would have been clearly demonstrated that the connection had no future. There are such places, though happily they are a small minority.

Progressive managements are trying to get the best out of their technical men by opening up possibilities for creative thinking for them both in production and distinction. The textile industry is one of the best places in the world to try that because so little of it has been tried until recent years. There is no question but what the age of bluster and bull-dozing is passing out and an age of careful and scientific thought is coming in. In fact, it is already in.

In general the new technical graduate should take no thought for the security of a comfortable berth, a pay-check or a pension fund. Our forefathers did not come over here to get a pension nor even to found a nation. They came over here, facing possible death for themselves and their families, simply to find a place where an individual would have the privilege of working, to produce a livelihood for himself and his family. There was no such thing as security then. There is not now. The hazards faced by them and by us are different, but ours are no less hazards.

WE FACE HAZARDS

The principal hazards which we face are two. One is the possibility of restricted personal freedom. The other is economic and has to do with long range changes taking place in the value of our money. These changes are rendering doubtful the value of every long-term dollars contract such as bonds, endowments, insurance, pensions and social security. History does not yet record the name of any nation that has ever started out on such a course which ever finally stopped before its money was worthless.

However, in every nation which has undergone such long range changes in the value of money, the textile industry has turned in the most outstanding record of any industry, particularly for the stockholders of the outstanding units. In this respect the textile industry far outstripped its nearest competitors, the natural resources industries. This is well illustrated and documented by William S. Landis, Vice-President of American Cyanamid Corporation until his death, in a study entitled "An Engineer Looks at Inflation," which was prepared for and circulated by The Duke Endowment.

There is no doubt that the textile industry has at last entered upon a phase of development in this country which is destined to carry it to great heights. This development is going to require scientifically trained men familiar with theory, who can use it and adapt it to new machines, new processes, or new fabrics. With such basic conditions the future can only be much greater than the past and you can be very certain that the rewards and opportunities will keep pace with effort, ingenuity and results.

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Liberty, S. C. Fountain Inn, S. C.
Greenville, S. C.

SOUTHERN BOOM

(Continued from page 14)

manufacturing as well as a host of other types of industries. During the eight years just passed, sixteen Southern states boosted the value of their manufactured products six points above the total United States average, a fact which is indicative of the tremendous sweep which industry including textiles is making in this area.

Gaining its impetus from the feverish activity during the recent war, the trend toward development of manufacturing industries in the Southeast has continued at a steady pace, according to R. P. Jobb, manager of development service of the Atlantic Coast Line Railroad Company, Wilmington, North Carolina.

Great effort is being made on the part of the people of the South to acquire a balanced economy between agriculture and industry. Mr. Jobb points to the part played by the many natural advantages of the area, and how the citizens are thinking in terms of the future by taking careful inventory of the facilities available, and those which will be needed. As a result, the utilities such as railroads, electric power and highway facilities are being constantly enlarged.

THE MODERN MILL

With this tremendous influx and expansion of textiles in the South has appeared an entirely new type of mill architecture which is to be seen over the countryside. This is the one-floor plant which, in the opinion of John A. McPherson of Greenville, South Carolina, is the building of the future.

He points out, in tracing the growth of the textile industry in the South, that prior to the Civil War there were few plants in existence, and it was not until 1870 that any significant growth was noted. The present century has witnessed the addition of bleaching, dyeing, printing, and finishing, and today the South has the distinction of being the principal producer of textiles in America.

This has been, to a great extent, at the expense of the North and East. According to Mr. McPreson, the most important factors effecting this move were capable management and efficient and co-operative labor. Whereas good management can get along with poor labor, the reverse is not true. Good labor poorly managed will usually fail.

Although the South has had the advantage in lower labor costs, the relative difference in real wages between the North and South is practically equalized. However, the differential due to climate and cost of living still exists, and is an important factor.

A good manager attempts to anticipate problems in advance, but he can not wait for future inventions and progress that may come at some later date. He must build for his day and his time.

This principle is made clear by a study of the past. The first mills were built to take advantage of river power. Today, electrical power enables a great flexibility in location and arrangement of machinery to best take advantage of the smooth flow of production.

The single-story design serves the most interests best in this respect. The one-level operation permits ease of future growth and expansion. With a flow in a U line of progress, both raw material and the finished product enter and leave the same side of the plant, which concentrates the shipping and receiving departments for best supervision. In the use of a one-story building, many columns are eliminated, which permits the maximum flexibility in machinery arrangement. The square design predicted for the future makes for the shortest and most direct access to all services.

There are many other advantages too numerous to mention, but according to Mr. McPherson, they are worthy of comparison and study by those contemplating new plants.

OPTIMISM IN THE SOUTH

One of the main factors in this development of the South is the optimism and spirit of co-operation shown among its people. The Southern Railway System is typical.

Knowing that the area they serve was of great economic potential, they established early in their history a department to advise people on problems of agriculture and industrial development. The agents in these departments worked with the farmers and business men for mutual advantage and today the signs of this effort are everywhere.

In the period from 1939-1945, the South's textile production increased by a billion dollars. Other industries such as food and mineral production have increased the value of their products by a similar amount so that today the South has a well-diversified and growing list of industries.

The Southern has done much to bring about this happy situation. The Southern's President, Ernest E. Norris said of the South's future: "It's an optimism compounded of the faith and aspirations of all Southerners. It's an optimism born of the certain knowledge that our Southland is today the brightest star on opportunity's horizon. And, it's an optimism nourished by an awareness that, great as our past growth and progress has been, the best is yet to be."

To emphasize this growth, the "Blue Book" of Southern Progress' shows that Southern states have increased their manufacturing by 90% since 1939, and estimates the value of such products to be in excess of $37,000,000,000 in 1947.

In an effort to better serve this new South, the Southern system conducts a never ending program of expansion and modernization of their facilities. They, along with many others, believe that tomorrow will be an even greater day.

(Continued from page 14)

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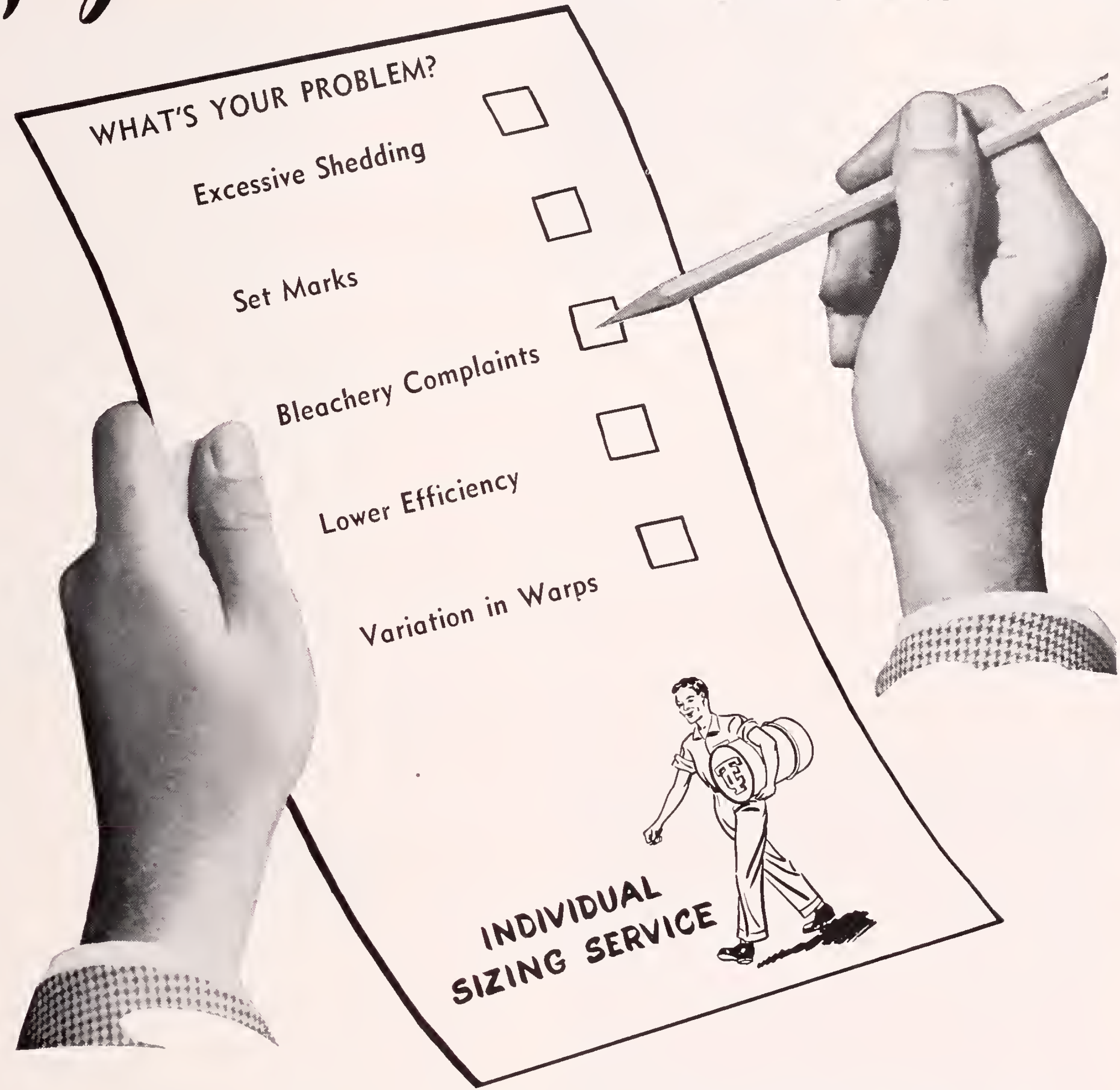

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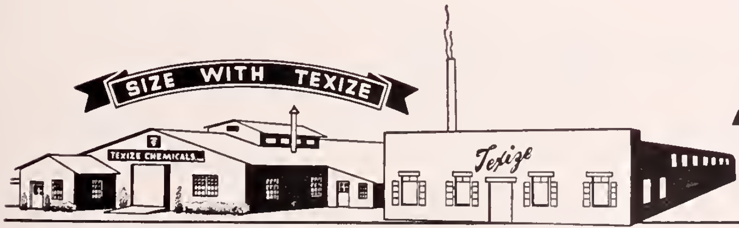

Texize Chemicals, Inc.

INDUSTRIAL CHEMICALS

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G. T. McLeod Wins New York Trip

Victor I. Lubash

This past fall, George T. McLeod, Textile Manufacturing Junior of Greenville, S. C., was one of the five winners of the J. W. Valentine contest. This contest was open to any male between the ages of 18 and 25 years, who was either employed in the textile industry, or a student in a textile school. The immediate object of the contest was to give the textile student and worker an opportunity to view the operations of the Worth Street Market, and to learn how this market benefits the textile industry as a whole. All five winners were awarded a three day all expense trip to New York City. The contest consisted of a letter, two hundred words or less, on the subject, "Why I Chose the Textile Industry as My Life's Work."

While in the garment center, New York, the winners followed the process of the cotton textile industry from the futures market to the New York Cotton Exchange, through to the clothing manufacturer. Other highlights of the trip were the attending of the telecast of the Arthur Godfrey Show, and seeing the musical production, "As the Girls Go."

The text of McLeod's winning letter is reproduced below.

Why I Chose Textiles As My Life's Work

I did not choose textiles as my life's work for any glory or publicity, for there is very little of either in this field. I chose textiles because I was raised in the textile center of the South, have known textile people all my life, their ways, their likes and dislikes, and I am firmly convinced that I can achieve greater success by working with people and conditions with which I am familiar.

The textile industry has made more improvements, in the past twenty years, in working conditions than any other industry. No longer is there the sweat shop conditions that once prevailed in the textile industry. The modern air-conditioned mills that are increasing in number every year throughout the South have made working conditions comparable to that of any other industry.

The introduction of synthetic fibers such as nylon, rayon and orlon are ample proof that research in textiles is practically unlimited.

In brief, I believe that whether a young man should choose textile research, textile management or the selling of textile machinery the field is unlimited.

Clemson's Textile School, 1896—?

(Continued from page 13)

the early 30's there were nearly 300 students enrolled in the Textile School. The building, machinery, and all training facilities were insufficient to take care of the number enrolled in this school. Dr. E. W. Sikes, then President of Clemson College, and Dean H. H. Willis, then Dean of Textiles, appeared before the State House Committee on Education with the request for a new and larger textile plant at Clemson College.

In addressing the committee, Dr. Sikes and Dean Willis pointed out that South Carolina had more active spindles and looms than any other state, that the value of the output of the South Carolina mills was enough to justify such a plant for training textile students in South Carolina, that 85% of those gainfully employed in South Carolina industries were in textiles, and that the payroll of mills in this State was approximately $60,000,000 annually.

NEW TEXTILE BUILDING

At that time, Clemson's School of Textiles had grown in enrollment from 65 students some ten years before to 292 students, and all graduates who desired jobs in the industry during that period had been placed. Dean Willis also pointed out that the request for Clemson Textile graduates was increasing.

The State House granted the request and appropriated the major part of the $475,000 for the new building.

This building, with 127,000 square feet of space, valued with contents in 1945 in the Survey Report of Public Higher Education in South Carolina, made by the Division of Surveys and Field Services of George Peabody College for Teachers, at $545,000, and containing fourteen classrooms, twenty-seven laboratories, two shops, and an auditorium was easily capable of accommodating a much greater enrollment and many additional research laboratories.

The establishment of the J. E. Sirrine Textile Foundation has made available a great portion of the funds necessary in carrying out many proposed projects of the school.

Mr. J. E. Sirrine, for whom the new Textile building was named, gave impetus to a movement for a great Textile School at Clemson, the work of which is now destined to provide leading men for the advancement of textile industry, not only of South Carolina, but of the world.

Courses for the early Textile School were divided into three groups: The Division of Textile Chemistry and Dying, the Division of Carding and Spinning, and the Division of Weaving and Designing. Since then these courses have been altered with subjects being added or removed from the curricula as the changes in industry fluctuated and demanded.

Out of ten principal textile schools, only two are older than Clemson. It was the first Textile School to be established in a Land Grant College, and is one of the most complete Textile Schools to be found in any American college.

At present, approximately twenty-five percent of Clemson students are choosing a textile course. The Textile School of Clemson is truly a pioneer, and proudly lives up to the highest "ideal" of Mr. Clemson.

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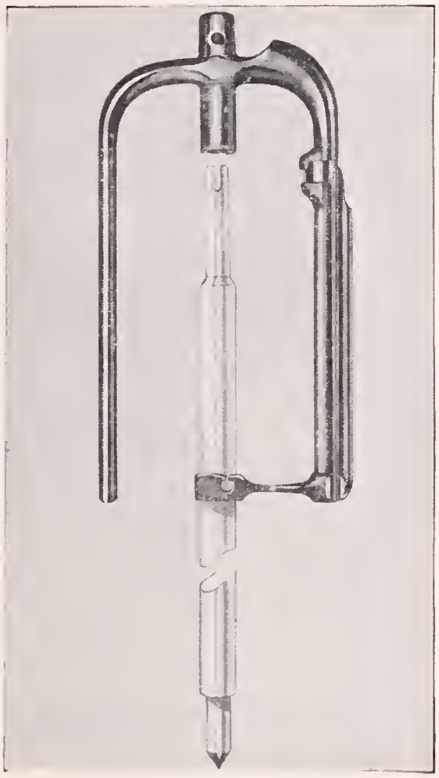

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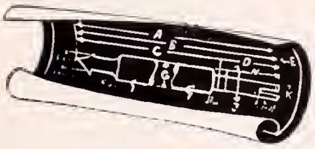

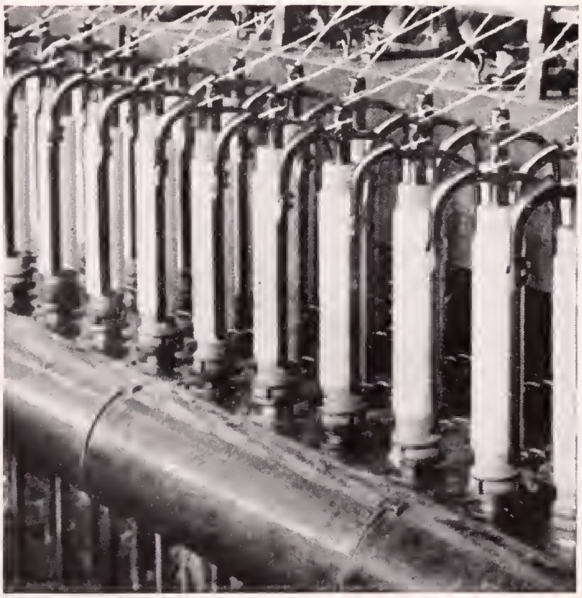

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"Orlon"—Du Pont's Latest

(Continued from page 10)

Durability is much more than just resistance to abrasion. It is resistance to all types of degrading influences, such as sunlight, acids, solvents, heat, mildew, insects, and bleaching agents. It is lack of shrinking or lack of stretching during washing. For instance, "Orlon" sets a completely new standard for durability in sunlight, when compared with any other natural or synthetic fiber.

Ease-of-care involves mainly the maintenance of dimensions of a fabric or garment during washing or during use, the ability to use fabrics without ironing or with substantially no ironing, and the rapidity of drying of an article after washing. "Orlon" is almost completely stable dimensionally in properly finished fabrics. In addition, "Orlon" shows a negligible change in dimensions with changes in relative humidity. "Orlon" can be stabilized by heat to produce a permanent pleat or crease which will be retained after repeated laundering. Creases put into "Orlon" with a warm iron are easily removed at the same ironing temperature and can be put in repeatedly without damage.

"Orlon" offers **covering power or bulk with light weight.** It is possible to produce from "Orlon" an awning fabric that is only 60% as heavy as current standard cotton awning fabric, yet which gives adequate coverage or protection with greater ease of handling and exceptionally long life. Men's suiting fabrics of 100% "Orlon" have demonstrated that "Orlon" is up to 30% thicker per unit weight than comparable all-wool suitings. It is also true that a 100% "Orlon" suiting—30% lighter in weight than the same wool suiting—would be equal in thickness and equal in warmth. This fact has been demonstrated in thermal insulation tests involving wool and "Orlon" suitings.

DYEING EFFECTS LIMITATIONS

The continuous filament product from our first plant cannot be adequately colored by conventional dyeing methods and processes, so our efforts to date have been concentrated largely in industrial uses such as wet and dry filtration, awnings, sailcloth, outdoor furniture, auto tops, and sewing thread, where dyeing requirements are at a minimum or where adequate coloration appears attainable by existing techniques. In the domestic field, emphasis has been on curtains—ninons, marquisettes, casement cloths, drapery linings—and related items. Only limited work has as yet been conducted in the apparel fields in items such as men's shirts—both business and sport types—uniform cloths, and in decoration and striping effects. We cannot overlook, however, a strong and growing interest among leading textile concerns in "Orlon" fabrics for all types of apparel uses. This is arising from the pleasing textural appeal of these fabrics, their ability to recover from wrinkling and mussing, the lack of surface pilling in napped or sueded fabrics in laundering and in wear, their stability against slippage, and their bulk for light weight.

FURTHER RESEARCH

In addition to continuous filament yarn, we are examining the possibilities of "Orlon" acrylic staple on a research and development basis. In this work we have achieved much improved dyeing characteristics which, coupled with its other properties, make it an extremely interesting product from a market standpoint.

(Continued on page 40)

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Editorial - -

RESPONSIBILITY

BERLYN K. SUTTON, T.M. '50

IN society are to be found three general attitudes toward the question, "shall I accept responsibility while a college student?". One may as well ask himself if he wishes to become educated while in college. It is not too difficult for one to classify himself as to the three attitudes. He may do this by simply considering the following statements.

In one class, and a rather distinguished group, are those who realize the value of experience, and are prone to accept every opportunity within their ability and time limitations. By this it is not meant that a person of such desire will be a "yes" man to all proposals. Careful thought and consideration must be devoted in order to ascertain the prospects of accomplishing the task efficiently. One must make a decision as to his willingness to accept the inevitable personal sacrifices which will be experienced. Finally, one must feel reasonably certain that he is capable of executing an acceptable performance.

A second class is saturated with the group of beings who are "in the middle of the stream". In them is a doubt as to whether it is more important to devote their time to outside activities or to have their spare moments consumed by personal amusement. Some are properly fitted in this group; however, there are others who are potent with ability and intelligence, but for various reasons tend to waste their talents in the form of an inactive brain. If one finds himself in this group he should be greatly concerned.

Finally, there are in existence those persons who will not accept responsibility, cannot see any value in the acceptance of responsibility, and have no respect for those who are attempting to further their education by participating in responsibility. Such thinking is readily distinguishable in college society.

Perhaps if the members of these last two groups only foresaw what lies ahead of them in the industrial world, with its many harassing and time consuming activities, they too would take advantage of their opportunities which are constantly waiting to be adopted and developed. Is there actually a necessity of such concern? The author profoundly states a "yes" to this question. The reason is this. Everyone must sooner or later bear responsibility, and there is no time like the present.

Following is an analysis of the situation as the author sees it: the why's of responsibility acceptance.

It is an unavoidable human fault to be born into this world imperfect in every way, and to remain in this state of apathy in all undertakings throughout life. But, there is no law, no code of ethics, and no religious doctrine which states or would lead one to believe that he cannot work with vim and vigor toward this unobtainable crest of perfection. It is an accepted fact that experience is the best teacher, and that the most effective method of learning is by making mistakes. This is indicative by the fact that colleges stress laboratory work very strongly. These college years can be one's experimental days in more ways than one! It is entirely possible to detect and correct falacies of thinking and principle before the time arrives when one must pay in more expensive and detrimental ways. The sooner one begins eliminating these errors of the novice, the sooner he will be capable of accepting the responsibilities which are encountered in the business world. In order that one receive the maximum degree of benefit from his college experience, he must accept his problems with the knowledge that mistakes are unavoidable, and expected of the beginner; however, he must strive to commit each error once only! He should have no real fear, but an abundance of concern and interest. Through such experience one eventually gains a confidence in his own decisions. This should be evaluated as one of the most important aspects of education. A theoretical knowledge without the ability to reach effective decisions is of no worthwhile value to anyone.

The lack of ability to express one's self in writing is one of the most serious handicaps which can be experienced. There have been many people with brilliant thoughts and not the ability to benefit others with their knowledge. Too, there is always the danger of misrepresentation and disillusion on the part of an author. He must be particularly careful to write exactly what he means, because he is responsible for anything which appears under his name. Few, if any, people are naturally gifted with this power; consequently, it is to everyone's advantage to develop this ability continuously. This is particularly necessary in the textile industry, which in the past few years has grown to be one of the most intricately organized businesses to be found. With this growth and development has come a demand for many reports of various types. It is imperative that these reports be accurately, concisely, and intelligently written. By accepting every opportunity to write and speak, one is able to cope very satisfactorily with this problem. In college, such experience is readily obtainable by working on any publication or by acquiring membership in any one of the forensic societies.

It is impossible for any one to conceive of the problems which unceasingly arise in any business organization unless he actually obtains experience. Almost any extracurricular activity offers some attraction in this respect; however, in none is the opportunity to receive diversified training so great as it is in the college journalistic field. With this activity comes the inherent financial difficulties, the valuable experience of making contact with the business world, the necessary practice at composition, the experience of "meeting the deadline", and any number of smaller de-

(Continued on page 40)

Responsibility

(Continued from page 39)

tails. All of these and many others too are to be encountered in the progressive business organization of 1950.

Some people will shun the thought of being subjected to these laborious responsibilities; they feel that they are being subjected to such great burdens. While this may be true, they are forgetting one important thing. This "undesirable" burden is not all bad. On the contrary, responsibility is one of the greatest character builders to be found anywhere. It will subordinate many problems which might otherwise seem difficult, and that in that way eventually cause one's life to become seemingly less complicated. Everyone lacks that supreme character which is to be regarded as an ultimate goal for all humanity. This is just one intangible reward which one is eligible to receive if he will only partake of a little worry.

If students are to be motivated into taking full advantage of the benefits which are potentially available to them, they must be made to realize that they are far from the state of efficiency which they must acquire if they are to become a successful man of the world. This efficiency is obtainable only through experience, which may be had by merely accepting responsibility.

"Orlon"—Du Pont's Latest

(Continued from page 38)

"Orlon" staple offers the opportunity of approaching the desirable features of wool—the ability to recover from mussing and wrinkling and a soft warm hand—with the additive of ease-of-care features found only in the man-made fibers. Inherent mothproofness, dimensional stability, and long life resulting from resistance to degradation are added features of "Orlon" staple fabrics. The development efforts with "Orlon" staple are still in the pre-commercial stage and much remains to be learned about it by the textile technologists who are working with this material of so many fascinating possibilities.

It remains for the future to tell the part that will be played by "Orlon" and the other new synthetics in this revolution within the textile industry. **The textile school graduate of today is truly fortunate to enter an industry with the promise that the textile industry holds for the years immediately ahead.**

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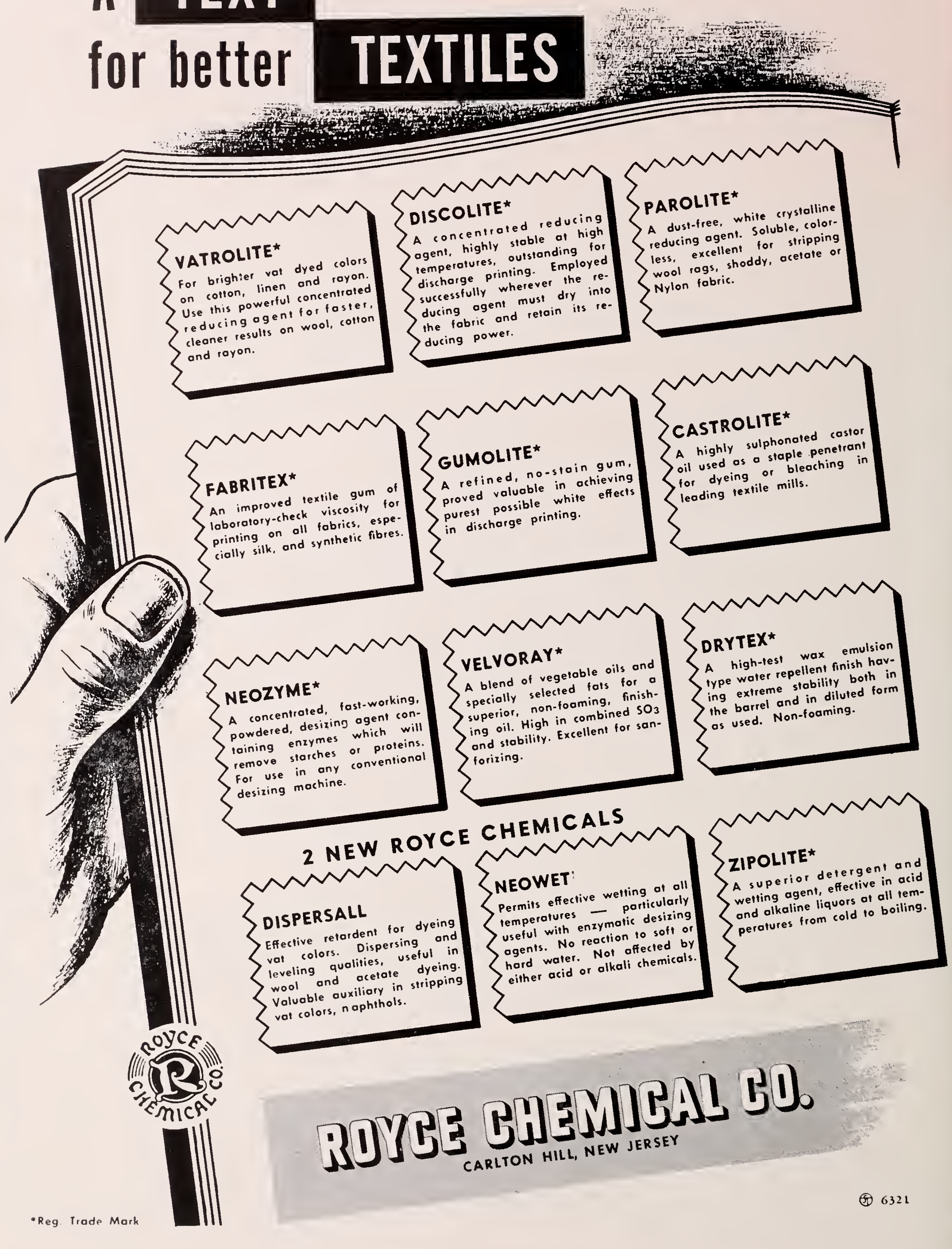

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VOL 9 FALL ISSUE 1950 NO 1

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THE
BOBBIN and BEAKER

Official Student Publication
Clemson Textile School

VOL. 9 FALL ISSUE, 1950 NO. 1

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The Cover

Christmas card shown on the cover was woven in the Jacquard Laboratory at Clemson College.

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School Of Textiles Begins Expansion Program

Over $300,000 In Equipment to Be Added; New Courses to Be Offered

WALTON B. CASSIDY, TM, '51

THE School of Textiles is at the present time in the midst of an unprecedented expansion program; over $300,000 worth of new equipment and machinery of the most modern design is being added to supplement the already rather complete and diversified arrangements and also to create new departments in answer to the varied demands of the textile industry and its correlated industries.

Various individuals and firms have been more than generous in their contributions, both in cash and in equipment—a fact which it is hoped will pay dividends for the textile industry in the form of better trained textile graduates, as well as to better prepare Clemson men for advancement in their chosen vocation.

With the cash donations made by friends of the College, the Textile School has begun an extensive buying program by which all phases of the already well-rounded educational program may be improved by the addition of a more eleborate laboratory curriculum, equipped with a complete line of modern textile machinery. Many firms have donated equipment which is itemized by departments in subsequent paragraphs. Organizations from which the new equipment is being purchased by the Textile School have granted discounts ranging up to 50 per cent. The addition of this new machinery adds up to but one thing—a greatly enlarged and improved Clemson Textile School.

Two entirely new processes of textile manufacturing will be available to Clemson Textile students in the near future—a modern worsted spinning system for the Yarn Manufacturing Department, and an up-to-date line of throwing equipment for synthetic yarns. Other improvements are being made in all of the various textile departments.

The Knitting Department, hitherto offering only a survey course as a sub-division of the Weaving and Designing Department, is being enlarged and renovated by the addition of new equipment which will place the Clemson Knitting Department on a level with similar departments in the other textile schools. The new Knitting option which was offered for the first time in the fall of 1949, has met with such surprising acclamation by textile students and the knitting industry that this department promises to become a very prominent and successful department in the Textile School. This remarkable growth can be mainly attributed to the effort and interest shown by Mr. W. O. Allen, head of the department who, in addition to working for a better Knitting Department, is in the process of publishing a new textbook on knitting.

The following list of equipment which has been consigned and donated to the Textile School has been added to the recently enlarged Knitting Laboratory.

4 Sewing Machines—Merrow Machine Co.
4 Sewing Machines—Singer Sewing Machine Co
1 Cutter—Eastman Machine Co.
2 Loopers—Southern Textile Machine Co.
3 Loopers—Burlington Mills Corporation
1 Looper Stand—Burlington Mills Corporation
24 Boarding Forms and Steam Tables—Paramoun Machine Corporation
2 H. Brinton Circular Body Machines—H. Brinton Machine Company
1 Sample Twist Warper—Cocker Machine and Foundry Co.
1 Sample Horizontal Warper Creel—Cocker Machine and Foundry Co.
1 Sample Vertical Warper Creel—Cocker Machine and Foundry Co.
Used Tricot Machine—Julius Kayser Co.

A good deal of diversified knitting equipment has also been purchased by the Textile School so as to round out an efficient modern Knitting Department. Included in this list are:

Standard Reverse Wrap Machine—Hemphill Co.
1 Check Test Preboarding Machine—Proctor & Schwartz
1 Knit Master Machine—Ainslie Knitting Machine Co.
2 Full Fashion Hosiery Machines—Wildman
2 Sewing Machines—Wilcox & Gibbs
4 Hosiery Machines—Scott & Williams
1 Hosiery Machine—American Holdstitch So.
1 Body Machine—Scott & Williams

The Textile Chemistry and Dyeing Department is being considerably renovated and improved upon by the addition of a large amount of modern dyeing and chemical processing machinery, selected so as to coverall phases of the dyeing and finishing processes now employed by the textile industry. The following list of equipment has been purchased by the Textile School from various firms who have allowed substantial discounts on equipment furnished by them:

Light Calendar—J. E. Carroll & Co.

Eppenback Home-mixer—Eppenback Inc.

Freas Gravity Convection Oven—Southern Scientific Co.

2 Dye House Trucks—Glasco Equipment Corp.

Laboratory Printing Machine—L & W Machine Shop

"B" Baby Vent Set—Buffalo Forge Co.

Fade-O-Meter—Slaughter Machine Co.

Launde-O-Meter—Slaughter Machine Co.

Crockmeter and Counter—Secretary, AATCC

Crockmeter Cloth, 1000 text squares—Secretary, AATCC

Color Transference Evaluation Chart—Secretary, AATCC

Scutcher—Birch Brothers

Bock Extractor, Model M-60—Morris Speizman Co.

Single Arc Weather-O-Meter—Slaughter Machine Co.

Laboratory Jig—Butterworth & Sons

Resin Curing Unit—Industrial Heat Engineering Co.

Single Spindle Top Dye Kettle—Riggs & Lombard

Sample Fulling Mill and Washer including individual drive—Rodney Hunt Machine

Tenter—Williams Miller Co.

Steamer—Curtis & Marble

Vacuum Extractor—Curtis & Marble

Singer—Ind. Heat Engineers

Miscellaneous—Greenville Steel & Foundry

Two Roll Padder—Greenville Steel & Foundry Co.

Three Roll Padder—Greenville Steel & Foundry Co.

One Plaiter—Greenville Steel & Foundry Co.

One Mixing Tank—Greenville Steel & Foundry Co.

Three-box Continuous Washer—Greenville Steel & Foundry Co.

Skying Unit—Greenville Steel & Foundry Co.

Two-box Washer-Saturator—Greenville Steel & Foundry Co.

Becco J-Box—Greenville Steel & Foundry Co.

Tight Washer—Greenville Steel & Foundry Co.

Take-off Reel—Greenville Steel & Foundry Co.

The Weaving and Designing Department has been considerably improved by the addition of a quantity of new looms and other equipment found in modern weaving and preparation departments. Shown here is a list of this new equipment and the firms from which it has been purchased:

12 Type C-6 Automatic Bobbin Changing Looms for Cotton—Crompton & Knowles

1 Type C-5 Automatic Bobbin Changing Dobby Terry Loom—Crompton & Knowles

1 Type C-5 Automatic Bobbin Changing Terry Towel Loom with Jacquard—Crompton & Knowles

3 Type S-6 Automatic Bobbin Changing Looms for Synthetic Yarns—Crompton & Knowles

1 Type C-4 Automatic Bobbin Changing Convertible Head Motion Loom for Wool Mixtures—Crampton & Knowles

1 W-3 Convertible Worsted Loom—Crompton & Knowles

1 X-2 Draper Loom—Draper Corporation

1 X-D Draper Loom—Draper Corporation

1 X-L Draper Loom—Draper Corporation

1 X-P Draper Loom—Draper Corporation

1 6-Spindle No. 250B Nylon Sizing Machine—Universal Winding Co.

1 6-Spindle No. 50 Pineapple Cone Winder for Nylon—Universal Winding Co.

1 6-Spindle Whitin-Schweiter Automatic Filling Bobbin Winder—Whitin Machine Works

1 "H-W" Yarn Conditioner—The Industrial Dryer Corporation

In addition to the new equipment which has been purchased the following equipment has been donated:

4 X-D Draper Looms for rayon and other synthetic yarns—J. P. Stevens Co.

Throwing Equipment for Synthetic yarns as follows—U. S. Textile Machine Co.

1 12-Spindle Redraw Frame

1 20-Spndle Model 10 Twister

1 40-Spindle Model 110 Uptwister

1 16-Spindle Face Drive Uptwister

The Yarn Manufacturing Department has been allotted funds for the purchase of equipment, other than the worsted spinning system, which is needed to modernize the Yarn Manufacturing Department in line with modernization programs now going on in the textile industry.The following equipment is in the process of being installed in the various Yarn Manufacturing Laboratories:

1 36-spindle Spinning Frame for Average Count of 30's, 3 1-2 Gauge—Whitin Machine Works

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A Brief History Of Asbestos -

A Material Woven Into a Fabric

J. W. CHRISTENBURY, TM, '51

IN MECHANICAL fabrics, we are all familiar with cotton, wool, silk, rayon, nylon and orlon. With these materials in mind, I would like to call your attention to another very useful and important material, older than anything in the vegetable, animal, mineral or chemical field which has been spun and woven. It is both fibrous and crystalline, elastic and brittle, yet it can be carded and spun. This material is asbestos.

The word "Asbestos", given to us by the Greeks, signifies unquenchable and inextinguishable. Asbestos is entirely different from any of the materials mentioned; as an illustration, a wool fiber is a shell-like formation; a cotton fiber is a flattened, twisted tube; a flax fiber is one with nodes or joints like bamboo; silk is two cylindrical tubes bound together with a natural wax. An asbestos fiber, however, is tapered from end to end, and is perfectly smooth.

You can appreciate the fact that any of the fibers mentioned will automatically cling to each other so as to permit their being alone in carding and spinning with good production. You can also realize that in attempting to use a fiber like asbestos that is perfectly slick, with each fiber tapered, you have the problem of trying to hold them together. It has been found that to use asbestos on a good commercial productive basis, a mixture of from 5% to 20% of rough tangus cotton can be used as a carrier for the asbestos fibers.

Probably no one knows the exact time that asbestos was formed. However, it is the general opinion that about a million years ago, asbestos was a viscous, red-hot mass of volcanic slag. This is supposed to have cooled into a rock formation, and it was the spring water containing carbon dioxide gas which was in the fissures and crevices of this rock formation that dissolved the rock on either side of the crevice and formed the fibrous crystals we now know as asbestos.

Asbestos is the finest fiber produced by nature. No one has been able to measure the fineness of these fibers, but with the most delicate instruments available, it has been estimated to be about 28 one-millionths of an inch in diameter. It can be broken down to one molecule in size. By comparison, silk or cotton fibers are more than three times as large as asbestos fibers.

The chief components of this mineral are approximately as follows:

Silica	41%
Magnesia	41%
Moisture	14%
Iron Oxide	3%

There are also traces of lime and alumina.

Cotton is generally classed by its staple length. Asbestos is not a good fiber by length, silkness or strength alone. It is the combination of these three properties that gives asbestos its flexibility—the proper blend for the production of good products. Asbestos is mined or quarried in a manner similar to rock or coal.

An eight percent yield from an asbestos mine is considered profitable. The raw material comes from Canada, Australia, Bolivia, China, Cyprus, India, Rhodesia, South Africa and Russia. Canada and Rhodesia are number one and two, respectively, in the production of asbestos suitable for spinning purposes. It comes to us from the mines in Canada and Rhodesia in a crude and fibrous form.

Asbestos cannot be carded directly as it comes from the mine. The raw material is placed first in what is known as a chaser mill. This consists of two rotating wheels on an axle revolving in a pan-shaped container. These wheels weigh 3,000 pounds each, measure six feet in diameter, and rotate at about 12 revolutions per minute. The wheels turning in this pan create a skidding action. Thus, the material is not crushed as in a hammer mill.

Special thanks are due Mr. J. A. Tennant and Mr. J. T. Griffis of Southern Asbestos Company. Their interest and cooperation have been of the greatest possible assistance.

The equipment used in processing asbestos is very similar to the wool system from this point. The willow, or box duster, a mixing picker and roller-top card are used. These cards are the same as used for wool with the exception of the clothing. Ring and mule spinning, twisting, winding, weaving, and braiding are among the various other processes.

There are many uses for asbestos, some of which go back to Biblical days. We are told that in 430 B. C., the Greek sculptor, Kallimachos, fitted an oil lamp with a wick of stone flax to the statue of Athena on the Acropolis. Furthermore, in the early Roman times, lamp wicks were made of what was known as "perpetual material" because they never burned out. It is said that the wicks in the lamps of the vestal virgins were made of asbestos.

Another early use by the Romans was the funeral dress of Kings. A specimen of the Roman cremation cloth is preserved in the Library of the Vatican. This was found in 1702, perfectly intact with some ashes inside, indicating that this was used for the cremation of Kings to preserve their ashes.

An interesting story is told of the use of asbestos in the form of a fabric during the reign of Charlemagne. From about 768 to 815, Charlemagne was King of the Franks, and Harun-al-Raschid was Emperor of the East. The Hoards of the East were in the act of over-running the Franks, and it appears that they greatly outnumbered them. It was Charlemagne's responsibility to devise a plan to protect his people. Therefore, he sent messengers to Harun-al-Raschid, summoning his representatives for a conference. It is related that during the conference, Charlemagne used a table cloth made of asbestos. After feasting upon the meal which had been previously prepared, he had the servants place the table cloth in the fire for cleaning. The Easteners were amazed when the table cloth was brought forth from the flame perfectly clean. Little time was taken in conference because they wer sure that they were speaking with a man of magic, and no numerical superiority could overcome their superstitions about trying to fight the supernatural and magic. The war ended, and Charlemmagne, the great King of the Franks, went on to bring the world out of the Dark Ages.

We also get some interesting stories from Marco Polo concerning his travels about the year 1250. He explored the Tartar Empire, which is now Siberia. He was amazed to learn that the textiles he found there resisted fire. Marco Polo had a very analytical mind, and after much questioning and search, learned how the fibers were obtained and prepared.

There was very little mention of asbestoc until about the 16th Century. Between 1710 and 1720, Peter the Great established a factory for the manufacture of asbestos from ore found in the Ural district of what is now known as Russia. The first items made were textiles, socks, gloves, handbags, etc. The enterprise failed after 50 to 60 years because of the limited demand for the products and the lack of transportation facilities.

Italy can really be regarded as the cradle of the asbestos industry. Besides the early use of asbestos by the Romans, the real beginning of the modern asbestos manufacturing industry was made there. One of the early stories of the manufacture of asbestos materials is that concerned with a certain noble-woman of Valtellina, Italy, who succeeded in having asbestos worked by weavers. Her experiments and studies brought to her the applause of scientists.

The most important discovery to the people of the Americas was made about 1860 in the Province of Quebec, Canada. It brought the source of supply of asbestos within range of a rapidly growing industry. Without this discovery, the United States would have been retarded greatly in its development of this product. The Canadian variety, while having somewhat similar mechanical properties to the material found in Italy, proved to be much easier to process. It is mined from one of the richest mining properties in Canada, which is the chief source of supply for "crude" used in the manufacturing of asbestos products in the United States.

The products so essential to our everyday life are many times overlooked, because asbestos is generally used in some unseen or little thought of place. We are inclined to take for granted certain things, such as brake lining on our automobiles, the clutch disc in our car, the insulation on the wires of our electrical appliances, the power cables on our battleships, submarines and merchant fleets. These asbestos products, plus numerous others, have made this "mineral woven into fabric" important in our daily lives.

Saran

JAMES F. BUXTON, '51

ACCORDING to the management of the Abbeville Mills Corporation of Abbeville, S. C., there are few definite facts that can be adhered to in respect to machine settings used in the processing of Saran to a finished product for jobber consumption. Saran is a relatively new monofilament yarn which has entered the textile field production at the Abbeville Plant since 1944.

Saran is a copolymer of vinylydene chloride. The Saran resin is manufactured by The Dow Chemical Company and is spun into a filament by the National Plastic Products Company. The qualities of Saran make it ideally suited for use in handbags, luggage, upholstery, and automobile seat covers. It is also used in the manufacturing of window screening for many of today's modern buildings. Due to the large amount of research that has been instituted by a number of the leading manufacturers, an unlimited amount of uses for the Saran fabrics have been discovered which gives it an incomparable position in the field of plastic fabrics.

WARPING

The Saran is received in spool form from the National Plastic Products Company. The yarn is then unpacked and placed in the V-creel which has a 6000 spool capacity and run to a direct warper. Slower speeds are required in warping Saran than those utilized in the processes of cotton, wool, and other similar fibers. The capacity of a beam is usually 1600 yards with 4500-6000 ends per beam. In controlling the static electricity on the warper, the most significant factor is the regulation of the room temperature and humidity.

The quill winding is done on a Whitin-Schweiter Automatic Filling Bobbin Winder. The high tension applied in winding the filling on the bobbin and the characteristic hardness quality of the plastic causes heavy wear on the ceramic parts of the winder. When the yarn breaks and the bobbin is less than one-fourth full, the Saran is declared waste. It is desirable to have as much gradual taper as possible on the filling bobbin.

WEAVING

After the ends are drawn through the harnesses, the warps are brought into the weave room as they are needed. Crompton and Knowles W-3 looms are used by the Abbeville Plant. These looms were running at 116 picks per minute. As in the warping process, the slow speeds in weaving result in more production and better cloth. More mechanical break-downs resulting from high loom speeds increases the loss of machine hours thus reducing the amount of production. As in weaving wool, cotton, and other fibers, many troubles are experienced in the processing of Saran. Some of the most serious of these troubles are due to the sloughing-off of the filling and uneven filling cracks in the woven fabric. The sloughing-off is caused by not winding the quills tight in the initial process. This can be corrected by placing more tension on the winding mechanism, thus attaining a more compact bobbin. The uneven filling is caused by static electricity and not enough weight on the beam. This can be prevented to some extent by the use of an oil applied to the filling while it is being wound on the filling bobbin. The cracks in the fabric are identified as a spread between individual filling threads. They are a result of the beating-up and static electricity encountered by the friction and rubbing together of the filling in relation to contact with the reed. These crack defects may be eliminated by adding weights and setting let-off mechanism for smooth operation.

Excessive ballooning of the yarn in the shuttle was one of the first problems encountered in the processing of Saran. This was solved by completely lining the shuttle with a special type wool. An interesting observation found at this point was the absence of bristles in the shuttle so commonly found in shuttles weaving cotton. .

The looms in operation at the Abbeville Mills were running with electric stop motions for the warp and center-fork stop motions for the filling. Good results have been realized from this arrangement. The selvage ends are usually rayon or cotton. Saran selvage will slip when placed in the clamps on the tenter frames therefore reducing the amount of tension or stretch on the width of the fabric as it is being finished. Very little slippage is evident if cotton or rayon selvage is used.

Air conditions in the weave room were controlled at 72% relative humidity and 85 degrees F. temperature. However, the Abbeville Mills would like to operate at a slightly higher temperature. Due to several prevailing circumstances, this was

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Clemson Textile School Reaches A New High In Comparision With Other Textile Schools

WALTON B. CASSIDY, '51

At the present time the Clemson School of Textiles is the largest such school in the point of student enrollment having a student body of 681, comprised of students from all sections of the United States and some foreign countries. However, the bulk of the Textile School enrollment comes from the Carolinas and Georgia, the center of the textile industry in the United States.

Clemson students meet classes in a large, modern, four-story building which is a distinctive part of the beautiful Clemson campus. This building houses a highly diversified range of textile machinery and other necessary equipment pertinent to textile education—machinery and equipment which is used from day to day in the courses taught in the Textile School. Besides furnishing a home for the textile students and facilities for furthering their education along textile lines, this spacious building houses the research laboratories for the Cotton Branch of the Production and Marketing Administration, United States Department of Agriculture, and the regional offices of the American Cotton Manufacturer's Institute, Inc.—two organizations which have been instrumental in furthering progress in the textile industries.

Modern up-to-date textile equipment is found in the numerous textile laboratories; for example, new high speed looms and long draft spinning for both natural and synthetic yarns, Jacquard and dobby looms, the latest in combers and card room machinery, a complete knitting department, a selected line of equipment for the synthetic throwing process, modern dyeing and finishing equipment, and an efficient testing laboratory. At the present time much new equipment is being added which will further enhance the well-rounded curriculum in the four textile courses offered here at Clemson.

Another important conributing factor to the prominence of Clemson among the other textile schools is the size and quality of its faculty. The Textile School boasts a faculty of thirty-two men well versed in various elements of the textile industry. It is believed that this is the largest full time textile school faculty which is engaged exclusively in the teaching of textile subjects. In the light of academic background and practical experience in the textile industry, the Clemson faculty ranks as one of the finest among the textile schools. Included on Clemson's School of Textiles faculty are five Ph. D's and ten men with Master's Degrees as well as many professors who have held prominent positions such as superintendent, oversees, or consultant in various fields of the textile industry. Also four men are now on leave of absence working toward higher degrees—two towards a Doctor's Degree and two towards a Master's Degree. All of these factors tend to give the Clemson Textile School a well-rounded faculty capable of teaching a highly diversified range of courses designed to give the textile student—some knowledge of all phases of textile production and processing.

The School of Textiles is taking an active part in an unprecedented expansion program now in full swing here at Clemson. Educational facilities are being constantly enlarged and improved to help meet the textile industry's demand for competent textile graduates. Steadily and surely the Clemson Textile School is forging to the foremost ranks in textile education. This fact is shown by the ever increasing number of Clemson graduates who are occupying top positions in the textile industry. Already, in the minds of many textile men, Clemson has become a synonym for the best in textile education. May we ever hold intact such good will and continue to produce to the satisfaction of these men.

Dr. Pearson Does Research At Clemson

W. H. WALKER, '52

Many of you have noticed a new personality around the textile building and have wondered who she is. This distinguished lady, connected with the Bureau of Plant Industry, is Miss Norma L. Pearson, Ph. D.

Dr. Pearson is a research specialist on neps and it is her interest in their structures that has brought her to Clemson. Neps are small knots of fibers. They are not present in the freshly opened cotton boll, but are produced as a result of manipulation. They are found in the products of all the machines to which the lint is subjected from ginned lint to yarn. They appear in the yarn as unsightly specks which frequently do not dye properly. If present in large numbers, they lower the quality of the yarn considerably.

In general, there are two phases to the nep problem. One is the biological phase. Cottons of different varieties and cottons from different localities differ in their nep-forming potentialities. These differences are due primarily to differences in the fiber length, degree of secondary wall development, frequently called maturity, and to differences in the perimeter or cross-sectional area. In general, long fibers tend to nip more than short ones, thin-walled fibers more than thick-walled fibers, and fibers of small perimeter more than those of large perimeters. Length, perimeter, and wall-thickness characteristics are heritable, but also may be modified by the environment in which a cotton is grown.

The second phase of the nep problem is the mechanical one, concerned with how and why the machines acting upon the cotton fibers cause the small troublesome tangles.

What might be considered a third phase is the interaction of the biological and mechanical phases, that is ,the differences in reactions of cottons possessing different fiber characteristics to the various processes to which they are subjected.

The problem of nep formation is consequently a source of worry to persons concerned with all phases of cotton production and manufacturing from the cotton breeder on.

Dr. Pearson is a botanist and primarily interested in the biological phases, but feels that to obtain a complete understanding of the nep problem, the biological phase cannot be separated from the mechanical ones. That is the primary reason why she has been transferred to Clemson.

Pictured above is Dr. Pearson who is now working with the Government Testing Laboratory at Clemson.

Dean Brown of the Textile School is very interested in the nep problem and all its ramifications. Dr. Pearson and her superiors in Washington felt that his advice and interest would be of great value to her in her research on neps, particularly his advice regarding the problems of techniques and of instruments designed either to measure fiber properties or to eliminate some of the labor or personal error involved in so much of the study of cotton fiber properties.

At Clemson, she will have a better opportunity than she has had heretofore to study the reactions of cottons with specific fiber properties to the spinning process. Each year there is spun in the "Federal Spinning Laboratory" a group of cottons for the Division of Cotton of the Bureau of Plant Industry. These cottons are specially selected for variable characteristics and for places or conditions of growth, and will provide ideal material for nep studies.

Location here will afford an opportunity to carry on various other related lines of investigation which are possibly only in a field laboratory with facilities such as are offered here at Clemson. One such line of investigation is a study of the cotton seeds which do not matrue. These structures are called motes. They represent not only a loss of yield but are a source of nep-like, unsightly fragments in yarn and are a source also of the thin-walled nep-forming fibers.

Some study has already been made on motes, but

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Testing With The Uster Eveness Tester

GEORGE A. MOBLEY, '52

One of the many instruments and machines recently acquired by the Textile School is a Uster Evenness Tester. This instrument, which tests silver, roving, or yarn for uniformity, promises to be a great help in quality control and trouble shooting in textile mills.

The tester, manufactured by Zellweger, Ltd., of Switzerland, employs an altogether new technique for yarn testing. Most testers built up to recent times have been based on compressing the strand of fibers between rollers, or on some similar mechanical principle. The Uster Evenness Tester uses an electronic device for detection of variations in the cross-section of the strand.

Technically, the instrument consists of a high frequency oscillator, with its frequency controlled in part by the capacity between two plates in a measuring slot through which the yarn or silver is passed. Since the material to be tested is an insulator, it possesses dielectric properties, and variations in its cross-section will change the capacity between the two plates. This varies the frequency of the oscillator, and the change can be measured and related directly to the cross-section of the yearn.

The tester has a large range of application, and can be used on silvers up to 80 grains per yard, and on yarn as fine as 150's. This is a great improvement over the purely mechanical testers, which can be used only on silver ,roving and the coarser counts of yarn.

Working in conjunction with the tester is a recorder, which makes a permanent and accurate record of the percentage variation in cross-section of the strand. The recorder tape can be fed at rates of 1, 2, or 4 inches per minute, which is synchronized with 1, 2, 4, or 8 yards per minute of material tested. This gives clear, legible lines which can be readily interpreted. The periodic repetition of nonuniformities in a given bobbin of yarn or can of silver, in conjunction with various roll speeds throughout the previous manufacturing processes, can be used to detect the cause of the variation.

An attachment for the Evenness Tester, which was also acquired, is an Integrator which measures the average irregularities in the strand. The Integrator is connected into the instrument between the tester and the recorder in such a manner that it has no individual power connections. It averages the deviations of the curve on the recorder tape, and at any time will give the "mean linear deviation" for the last two and one-half minutes. In this way, a short, large increase in diameter, such as a slub in the yarn, would bear considerably less weight in the average than a small increase of long duration. Since the Integrator is fully automatic, it eliminates the laborious operation of averaging the irregularities by statistical methods. Also, because it takes small variations into consideration, its results should be very accurate.

Uster Eveness Tester which is located in the Textile Laboratory of the Clemson School of Textiles.

With proper use, the Evenness Tester, combined with the Recorder and Integrator, should prove to be a valuable asset to quality control departments as well as maintenance men.

———BOBBIN AND BEAKER———

AATCC News

The Student Chapter of the American Association of Textile Chemists and Colorists held its first meeting of the 1950-1951 session on September 26, and elected the following to serve as officers for this year:

Chairman	B. G. Estes
Vice-Chairman	W. B. Robertson
Secretary	C. B. Morris
Treasurer	M. G. Michaels

At this first meeting the second Tuesday night of

(Continued on Page 21)

Growing Pains; Knitted Style

V. I. LUBASH, TM, Feb., '51

The knitting industry had its beginning in the year 1589, with the invention of the knitting machine by William Lee. Though knitting had an early beginning, it has been in the last fifty years that the industry has made its most significant gains in the fields of production and quality control. Lee's invention was a flat machine with one thread of yarn. In 1783 another Englishman, Crane, improved Lee's invention by devising a way to add a guide and thread to every needle. This improved machine was the forerunner of the warp knitting machine of today.

In 1791, power driven machines were developed. Among the many other inventions contributing to the growth of knitting during this period was Cotton's Patent, the forerunner of the full-fashioned hosiery machine.

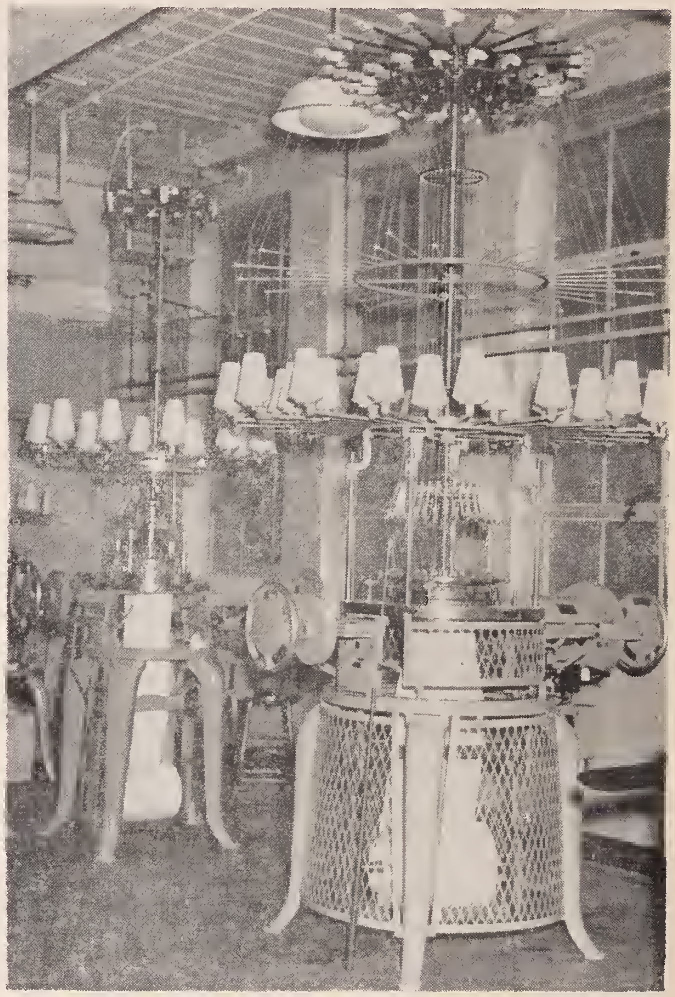
All the machines up until 1836 were employed in the manufacture of narrow width fabrics. In that year the first fifty-four inch machine was made. This hand-driven machine could produce ten courses a minute, and with the addition of power ,production was increased to 100 courses per minute.

Since England lead the world in the invention and manufacture of machines and machine-made goods, she jealously guarded her secrets by imposing heavy fines upon anyone caught exporting machinery. Due to these heavy penalties, the first knitting machines used in this country were the few machines that could be smuggled into the United States. But soon after the entrance of a small number of machines in the early part of the nineteenth century, the knitting industry started to flourish by leaps and bounds.

Full Fashioned Knitting

The year nineteen hundred saw cotton stockings being knitted on 33 gauge machines—the ultimate in fineness and sheerness at that time. The average production of these "sixteen foot leggers" was nine dozen pairs a day and the average profit to the mill was fifty cents a dozen pair. Remember, this was without all the extras we find in the merchandising of consumer articles today. The stockings were boxed in plain boxes, one dozen pair to a box.

Up until World War I, most of the knitting machines and spare parts were being manufactured in England and imported into this country. The outbreak of hostilities in 1914 created a need for the manufacture of knitting machines here in the United States. With the new demand, the forces of American mass production met the needs of the knitting industry and improved upon its technology. From the time of World War I to the present, knitting has made more progress than in any other similar period of history. One of the significant improvements in the past thirty years has been the increase from 33 gauge to the predominant 51 gauge of today. Other improvements include the drum type automatic course counter, the duo-narrowing machine, the lockstitch attachment which furnishes the means of producing the attractive picot edge in the welt of the stocking, and other devices permitting higher quality and greater production of hosiery.



Circular Kitting Machine which is part of the new machinery that is being added in the Textile School.

Circular Hosiery Knitting

The early circular knitting machines lacked the automatic features that are found on the present day models. These machines were built with stationary needles and rotating cams and were hand powered. Since the rotating cam ring was not perfectly balanced, it tended to vibrate at high speeds. Another limiting factor was the tendency of yarns to twist when more than one yarn was fed to the machine. This made plating impossible, except with the use of a rotaing yarn table, which in itself had its inherent faults.

As time progressed, more and more improvements were added to the circular knitting machine. In 1911 it was possible to knit a French welt with a selvage edge on a two-speed ribber. By 1926, the split foot machine was developed. Now it is possible to knit the high heel and sole independent of the instep with two separate yarns. With the passage of time, the number of needles in the machines steadily climbed, until now we have machines with 400 needles.

The interval between the wars also saw progress in the pattern knitting possibilities of the half-hose machine. This included attachments for horizontal stripping, reverse plating, and clock patterns by the introduction of extra warp. Other improvements, such as the development of a half hose machine that would knit both top and leg of the hose, was a boon to the men's hosiery industry. Today we find that almost every operation on the half hose machine is performed automatically, and the machines need almost no operative attention compared to the machines in use at the turn of the century.

Body Knitting Equipment

There has been very little change in the basic design of the body knitting machine. Most of the improvements have been inventions to eliminate labor and cost. The operation of the machine has been also improved during the years. The first body knitting machines were plain jersey machines, which produced jersey tubes from 7 to 24 inches in diameter. The yarn was fed from bottle bobbins, and the stop motions were greatly improved with the extensive use of the electrical stop motion. Formerly we had the ultimate of 12 feeds in a 24 inch diameter, today we knit with 24 feeds in a 24 inch diameter; one feed per inch. The yarn is now taken from cones instead of bottle bobbins, eliminating the cost of rewinding. Altogether, the body knit machine has been improved tremendously through the years; not as much in basic design as in perfection of original machine which will give the manufacturer more production and a better grade of goods at a lower cost.

Knitting Progress at Clemson

September of 1949 saw the installation of a new major in knitting, and since that time several new courses have been added to the curriculum. The knitting laboratory has been enlarged. New machines have been purchased by the school and have been installed. Upon receipt of a few more machines this department will be able to give almost complete theoretical and practical instruction to the student.

The fields of knitting to be probed by the Clemson student are full-fashioned hose, men's and boys hose, knit underwear construction and fabrication, knit outwear, tricot fabrics, cidega fabrics, and the cutting and sewing of any type of goods. From the above it can be seen that this department will soon be able to produce any knitted article from men's "T" shirts to women's blouses. This type of course involves a great number of separate textile industries and therefore the knitting student has the advantage of being placed in a variety of fields.

While the number of students taking this course is necessarily limited because of the need for much individual instruction, the new major has been well received by the students and is at the present time as large as it can possibly be. It is hoped that Clemson's knitting option will be of real benefit to the industry, the textile school, and to the state of South Carolina.

Credit: Professor W. O. Allen, Clemson Textile School.

Textile World July 1948
Knitter May 1590

——BOBBIN AND BEAKER——

ASTE News

TO START off the semester, the A. S. T. E. has selected eight new members. They are: P. M. Pitts, Clinton; P. N. Harvey, Clover; M. E. Price, Ninety-Six; R. F. Satterfield, Lymon; W. G. Holmes, Charlotte, N. C.; R. J. Kay, Trenton, N. J.; W. E. Carpenter, Graniteville; J. H. Scott, Honea Path. This brings the membership up to approximately 30 members.

The last club meeting was held on Nov. 28th. Mr. A. E. McKenna made a very interesting talk on warping and slashing. Reports were heard on our recent clean-up drive and then the meeting was adjourned for refreshments.

Officers for this year are: President, H. F. Magill, Concord, N. C.; Vice President, H. P. Worth, Greenville, S. C.; Secretary, J. D. Skerratt, Cranford, N. J.; Treasurr, G. Gage, Clemson, S. C.

Instructors Added To Textile Staff

W. C. Whitten, Jr.

SAM M. WILLIS
Instructor in Weaving and Designing

Mr. Willis is one of three new professors who were recent graduates of the Clemson class of 1950. Mr. Willis is originally from Greenwood, South Carolina, but is now making his home at Walhalla. He completed his high school career at Greenville High School at Greenville in 1945. After spending two years as a student at Clemson, he entered the Army and served eighteen months as a doggie with the Fourth Infantry Division stationed at Ford Ord, California. Mr. Willis re-entered Clemson in February, 1948 and graduated in August, 1950 with a B. S. Degree in Textile Manufacturing.

Sam M. Willis

W. C. WHITTEN, JR.
Assistant Professor of Weaving and Designing

A native of Walhalla, S. C., and a graduate of Walhalla High School, Mr. Whitten is another former Clemson professor who has returned to the Textile School faculty after a leave of absence spent in working on his Master's Degrees. During World War II, Mr. Whitten served in the U. S. Army for two and one-half years as a member of the 104th Infantry Division. After receiving his discharge, Mr. Whitten entered Clemson and received his B. S. Degree in Textile Engineering in the class of 1947. While at Clemson, he was a member of Phi Psi Fraternity and the Block C Club. Upon graduation, Mr. Whitten accepted a position on the Textile School faculty and taught for two years at the end of which time he entered Georgia Tech. He attended Georgia Tech for eighteen months and received his M. S. Degree in September, 1950. Mr. Whitten is married and is now living in the Clemson Homes.

W. L. WYLIE
Instructor in Yarn Manufacturing

Mr. Wylie is a recent Clemson graduate who has entered the teaching profession as a member of the Textile School faculty. Mr. Wylie hails from Winnsboro, South Carolina, where he received his high school diploma at Mt. Zion Institute in 1943. After serving in the U. S. Navy for thirty-two months, he was discharged with a rating of A. A. M. 3-c. Mr. Wylie entered Clemson in 1946 and received his B.S. Degree in Textile Engineering in August, 1950. While at Clemson he was a member of the American Society of Textile Engineers. Mr. Wylie is married and at present is living at 156 Milky Way, Clemson.

Edwin D. Jones

EDWIN D. JONES

A member of the class of 1950, Mr. Jones is the youngest member of the Textile School faculty at the present time. He is a native of Greer, South Carolina, and graduated from Greer High School of that city in 1946. Mr. Jones entered Clemson in the fall of 1946 and just recently received his B. S. Degree in Textile Manufacturing with the August group of 1950 graduates. While at Clemson, Mr. Jones was a member of the R. O. T. C. and received, along with his diploma, a commission as a reserve officer in the Quartermaster Corps of the U. S. Army.

W. L. Wylie

J. C. HUBBARD
Assistant Professor of Weaving and Designing

Mr. Hubbard, who has returned to the Clemson faculty after a year's leave of absence, is not a new professor to many of the older students, but for the benefit of the newer students, he has been included as one of the new professors.

He is a native of Lancaster and Columbia, South Carolina. After graduating from Oak Ridge Military Institute in 1938, he entered Clemson College from which he received a Degree in Weaving and Designing in 1942. Upon graduation he entered the Army and served for four years during World War II. He then spent eighteen months at the Institute of Textile Technology at Charlottesville, Virginia, where he held a position as a textile engineer. In 1947 he returned to Clemson as an instructor in the Weaving and Designing Department. After serving two years in this position, he entered the Georgia Institute of Technology which he attended for one year. Here he received his Master of Science Degree. While attending the Institute, he was a member of Delta Kappa Phi, honorary textile fraternity.

——BOBBIN AND BEAKER——

Dr. Pearson Does Research At Clemson

(Continued from Page 10)

much remains to be learned as to why certain seeds fail to mature.

Dr. Pearson has led a very interesting life, which she outlined to me a few days ago. She is originally from Bloomington, Wisconsin, where she attended high school. In 1918 she received her Bachelors of Arts degree from the University of Wisconsin. Upon graduation, she taught science for two years in Sparta, Wisconsin. She returned to University of Wisconsin and received her Masters Degree in Botany in 1921.

After teaching for one year at Cottey College in Missouri ,she joined the staff at Beloit College, Wisconsin, where she taught both Botany and Zoology.

She received her Doctorate in Botany and Plant Pathology from the University of Wisconsin in 1928.

In 1930, after teaching at Eastern Kentucky State Teachers College in Richmond, Kentucky, she entered government service in Washington, D. C. First, she went into the Cotton Marketing Division of the old Bureau of Agriculture of Economics and was later transferred to the Division of Cotton and other Fiber Crops and Diseases in the Bureau of Plant Industry, Soils, and Agricultural Engineering. During this time she wrote several technical bulletins and articles for the Journal of Agricultural Research, which were reprinted in pamphlet form for distribution.

During the war years of 1943 to 1945, Dr. Pearson was temporarily transferred to University of Michigan and worked on the botanical phases of milkweed floss production. At this period of the war, it was becoming increasingly apparent that it might be necessary to find some material other than "Kapok" to be used as a filler for life preservers. The war prevented the shipment of this substance from the Far East, so the scientists with whom Dr. Pearson was associated wished to investigate some of the problems which are connected with the use of milk-weed floss as a substitute for Kapok. Her articles on certain botanical problems connected with milk-weed floss production were printed in the American Journal of Botany and Journal of Agricultural Research.

Dr. Pearson says that her work is not glamorous, but that she enjoys it. Much of it is pure labor, and much monotonous routine. But there is always the interest as to how the next cotton studies will behave, what the next nep will look like under the microscope, for no two are exactly alike, and in more detailed miscroscopic studies, what the next slide will show. She says if she could have had her wish as to what she would like to have been, it would have been an explorer, so she could climb mountains and go up strange rivers and dig in ancient ruins, but she says the microscope has not been a bad substitute.

Dr. Pearson has a hobby. It is hand-weaving and she thinks that here in a textile school she will get many new ideas as to materials, designs, and techniques.

Where Are They Now?

H. G. BATSON, TM, '51

REMINISCING, contemplating, or call it what we may, Clemson's contribution to the Textile world has been no small thing. Looking back down the years, the list of Textile Chemistry, Textile Engineering, and Textile Manufacturing graduates has been ever increasing and with pride we can point out among the valuable men in the Textile industry, many former Clemson men. Since Textiles have come to the front, especially in the South, the need for trained men along this line is also increasing.

In the states throughout the union, Clemson is remembered and respected by many loyal sons, but let us pause for a few minutes and see what some of our graduates are doing in the textile field. For instance, **Charles P. Gordon**, graduate in the class of 1935, is general superintendent of Riegel's dyeing and finishing plant in Trion, Georgia. Mr. Gordon is Secretary of the South Central Section of American Association of Textile Chemists and Colorists. In the same plant, serving as chief chemist, we find **Ernie Freeman**, graduate of the class of '41. **John N. Talbert**, graduate of '39, is Production Control Head at the McCormick Spinning Mill. In the same mill, **William H. Ballenger**, class of '50, is a trainee in general accounting work; **B. S. Barnwell,** class of '40, is Second Hand in the Carding and Combing Department; **J. N. Workman**, class of '47, is Assistant Production Control Head; **G. H. Ashley**, class of '49, trainee in the Production Control Department; **B. C. McWhite**, class of '47, Office Manager. At Pacolet Manufacturing Company, Pacolet, South Carolina, are three Clemson graduates, **L. F. McMackin,** 47; **J. H. Harrold**, '49; and **D. W. Walker**, '47, employed in the Standards Department as Time Study Engineers. Three Clemson graduates are connected with Joanna Cotton Mills. They are: **J. K. Kaits**, '47, Supervisor of Standards Department; **C. B. Cannon, Jr.**, '49, Laboratory Technician in the Standards Department; and **L. A. Crawford**, '47, Assistant Superintendent. There are six Clemson graduates who are now working at Laurens Mills. They are:**T. C. Hunt**, '32, serving as Master Mechanic; **A. T. Wilbanks**, '49, is Assistant Production Control Manager; **E. P. Cleveland**, '40, serving as an Industrial Engineer; **T. L. Timmerman**, '43, is a Laboratory Technician in the Production Control Department; **J. W. Armstrong**, '48, is a trainee in the Weave Room; **J. E. Koopman**, '48, is a trainee in the Weave Room. Clemson graduates presently employed at Johnston Mill include: **J. G. Farrell**, '48, is Job Worsted Control Head;**R. E. Self**, '49, is Assistant Designer; **A. E. Punaro**, '48, is Assistant Designer; **A. B. Carwile**, '48, is Supervisor of Accounting; **R. E. Chandler**, '46, is Shift Overseer in the Weave Room; **P. H. Rosenberg**, '47, is an Industrial Engineer; **H. B. Knox**, '40, is Assistant Weave Room Overseer; **T. E. Peden**, '38, is Worsted Control Engineer; **F. A. Thompson**, '39, Plant Superintendent; **F. D. Hill**, '50, is a trainee in Industrial Engineering Department. Presently employed at Watts Mill are: **T. P. Townsend**, '29, manager of Watts Mill and Assistant Secretary of the J. P. Stevens and Company, Inc.; **H. B. Iler**, '48, Supervisor of Laboratory; **J. J. Nipper**, '49, Supervisor of Training; **W. M. Washington**, '47, Assistant Overseer of Weaving; **W. S. Armstrong**, attended Clemson 1938-1940, is Assistant to Superintendent; **R. C. Byers**, attended Clemson 1945-1946, is Supervisor of Wage and Rate Department.

If space would permit, we could go on and on. We are grateful that some of our best talent stayed close by to instruct and impart their store of knowledge to the newcomers to Clemson's Textile world. We feel that Clemson graduates, past and future, will make Textiles and Clemson synonymous.

Engineering In The Textile Field

HENRY F. McGILL, '51

DURING the early years of this century there was little incentive for a young man to attend a textile school because it was difficult to obtain jobs. Those were days when there was only cotton and wool to be spun. Today there are not only cotton and wool but many synthetic fibers and many blends. Now it is difficult for a man without a textile education to advance to one of the higher positions unless he has determination and can demonstrate that he has exceptional ability. In years to come, very few men will succeed in the textile field unless they have been educated for the business.

Now that the textile industry has seen a need for men with a technical education, many engineers are finding employment in that industry. Many of the professional organizations have formed divisions of their organizations in the textile field, and just recently the textile division of the American Society of Mechanical Engineers held a meeting of the Society in Worcester, Massachusetts to form a council for the advancement of engineering in the textile field.

Several years ago a number of Clemson students saw the need for such a society as the A. S. M. E. in the textile field. A professional organization, The American Society of Textile Engineers, devoted to the advancement of engineering in the textile industry, has now been formed at Clemson College.

The A. S. T. E. has not been organized nationally as yet. From such cities as New York and Philadelphia, letters have been received from graduates who want to form chapters in their immediate area. By forming such chapters throughout industry, better coordination between industry and educational institutions will be possible. The popularity of the Clemson Textile School will be greatly increased and, of course, the possibility of employment will be improved. The A. S. T. E. believes industry wants to know more about the courses which make up the Tevtile Engineering curriculum and the qualifications of the graduate in this major field.

We hope the A. S. T. E. will bring older alumni in contact with young graduates and develop acquaintances which may be of value to each.

Fluid Drive For Textile Carding Machines

RICHARD BOYD, TM, '51

PROFESSOR C. B. Gambrell, Instructor in Textiles at Clemson College, has recently developed and successfully applied the principle of transmitting power though a liquid for driving a textile carding machine.

By applying this fluid-drive principle to the carding machine, several undesirable conditions which now exist in the textile industry can be eliminated Professor Gambrell's main objective was to develop a successful individual drive to replace the overhead multiple drive, central power source method now in use in most textile mills. Due to the fact that overhead drives are highly susceptible to mechanical difficulties, they require constant maintenance attention. Also, if there is a failure of the central power unit, entire groups of cards supplied by the unit are shut down.

The majority of individual drives which are now in use for carding machines require larger motors for starting than for running conditions because of the great amount of starting torque required. As a result, this requires the purchase of a larger motor to meet the requirements for the starting load

Professor Gambrell's application is relatively simple and inexpensive. It allows the use of a motor approximately 1-3 the size of that used on most individual card drives. Shock load and torsional vibrations are cushioned out through the fluid coupling so that a gradual and smooth flow of power is always obtained.

Phi Psi

IOTA Chapter of Phi Psi started the semester with a meeting on September 14. Included in the business taken up was the appointment of committees which were to study the project for the annual Phi Psi Convention and to compile a list of Phi Psi Alumni. Through the efforts of our president and other officers, and with the assistance of Dean Brown, the Phi Psi room in the basement of the Textile Building has been painted and redecorated and several new pieces of furniture obtained.

On October 6, we were honored to have as our guest the Grand President of Phi Psi, Brother M. Earle Heard, who is vice president of the West Point Manufacturing Co. at West Point, Georgia. Brother Heard visited Iota Chapter for the purpose of conferring honorary degrees on Mr. Walter Regnery, President of Joanna Cotton Mills, Joanna, S. C., Mr. Harold Whitcomb, Vice-President of Fieldcrest Mills, Spray, N. C., and Mr. H. B. Wilson, Assistant Professor of Yarn Manufacturing at Clemson. Before the meeting, the Chapter enjoyed a steak supper at Kluttz Steak House.

On Novembr 4, the Chapter held open-house for Phi Psi Alumni, guests, and faculty after the Duquesne-Clemson football game. Approximately one hundred guests visited the chapter room, where refreshments were served.

NEW MEMBERS

The sixteen new pledges who were initiated on November 20, are Brothers L. S. Bomar, R. L. Broadwell, A. H. Clarke, E. E. Cothran, Bernie Fleischer, C. E. Hollis, W. G. Holmes, R. L. Keasler, J. L. Mooneyhan, C. E. Reddick, H. G. Rushton, L. J. Sigmon, D. M. Simpson, J. J. Snee, W. L. Thompson, and W. H. Walker.

GREENVILLE ALUMNI CHAPTER:

DURING the past semester, we have been in the process of compiling a list of names and addresses of Phi Psi Alumni in Greenville and surrounding area This list is complete and a Dutch supper is to be held at Greenville, S. C., in the very near future for the purpose of reactivating the Alumni Chapter. The coupon below was printed in the last issue of this publication, but if any alumnus located in the vicinity of Greenville has not contacted Iota Chapter, please do so immediately.

NEW OFFICERS

AT A MEETING held November 30, officers were elected to preside over the chapter for the coming semester. Since several of the present officers are graduating in Feburary, it was necessary to hold this special election. The new officers elected were Walton B. Cassidy, President, W. Clyde Hayes, Vice-President, William G. Raines, Senior Warden, Bernie Fleischer, Junior Warden, and George A. Mobley, Secretary and Treasurer. Fortunately, we are losing very few members this semester. Among those graduating, however, are W. M. Kirby, President, J. W. Christenbury, Vice-President, J. F. Cathcart, Senior Warden, W. H. Dixon, Secretary, C. E. Hollis, J. F. Buxton, C. E. Reddick, D. J. Brett, H. O. Bryant, .B D. Hicks, C. J. Price, J. H. Stewart, and R. N. Van Ham.

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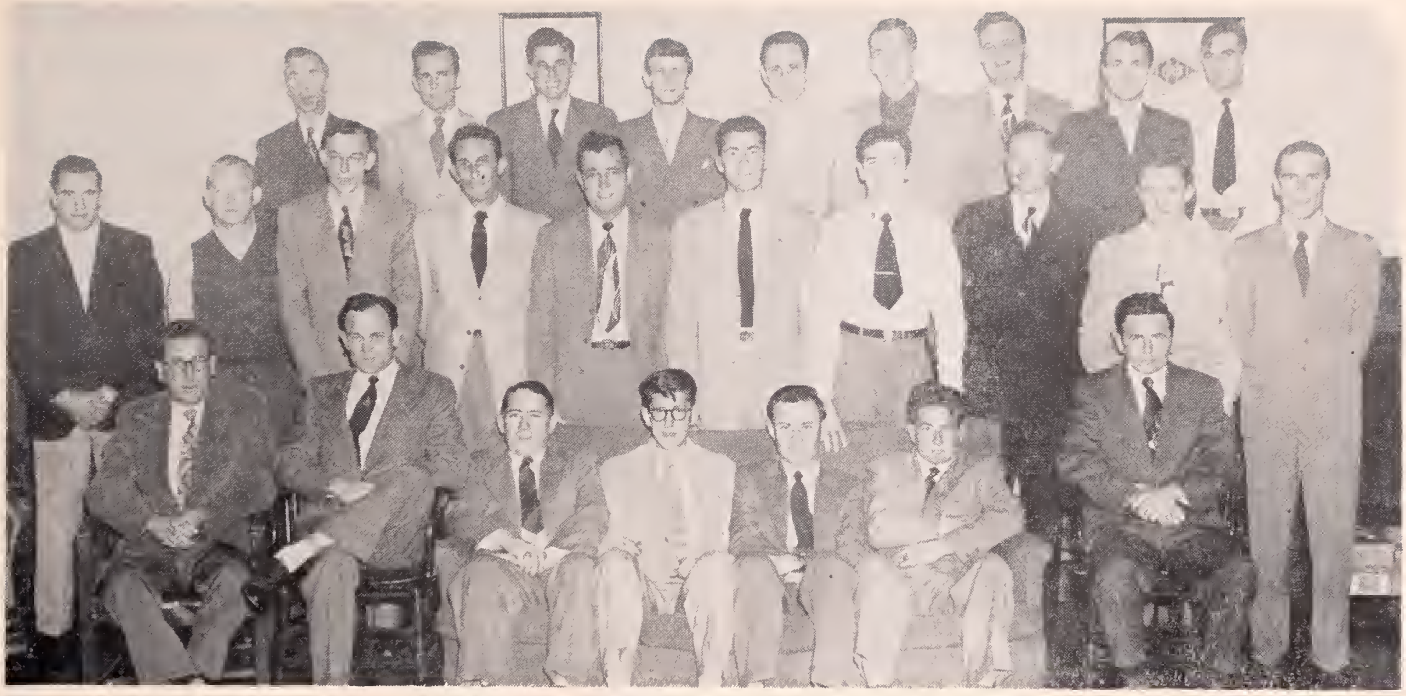

Standing, Back Row, Left to Right: J. R. Varner, C. W. Hance, R. A. Bowen, R. N. Van Ham, B. Fleischer, J. F. Cathcart, C. E. Reddick, W. H. Walker, L. S. Bomar. Standing, Second Row, Left to Right: H. G. Rushton, B. D. Hicks, E. E. Cothran, R. L. Keasler, H. O. Bryant, Jr., C. E. Hollis, W. Raines, G. A. Mobley, J. F. Buxton, A. H. Clarke. Seated, Left to Right: J. W. Christenbury, R. B. McKinney, W. H. Dixon, W. B. Cassidy, W. C. Hayes, W. M. Kirby, Jr.. W. G. Holmes.

Saran

(Continued from Page 8)

not feasible at the time. The most common patterns or weaves used in the manufacture of plastic goods are the 2/2 regular twill and the herringbone twill. This is a result of consumer demand. An interesting factor about Saran found so noticeable in the weaving process is the effect of the different colors on the weaving efficiency. Characteristics of the different colors create problems that can only be solved as the goods are being woven. This leads one to regard Saran as being unpredictable; therefore no set rules can be followed. The average construction of Saran fabric is 1 1-8 pounds per yard with 64 ends and 30 picks per inch. The yarn count is usually 10 mil or 12 mil. However, fabric specifications are largely left up to the buyer.

CLOTH ROOM

The woven fabric is next taken to the cloth room where the cloth is graded. The gray goods are inspected first on the back and then run through again for inspection of the face. The usual inspection is carried out here in the same way as for other type goods. The fabric is put up in 50 yards for further finishing operations.

FINISHING

There are two machines used in the finishing of Saran—the Verdium Calendering Machine and the Tenter Frame. To which machine the goods are first fed depends entirely upon the kind of fabric being run. In yarn form, Saran is round in cross-section. After calendering in cloth form, the yarn is flattened. This process changes the appearance of the cloth materially, giving the cloth a fuller, closer-woven effect. The weight on the two large rolls on the machine is from 15 to 30 tons. Temperature of rolls is approximately 260 degrees F.

The Tenter Frame process is used to stretch the fabric so as to increase its width and also to frame the fabric. This is accomplished by hot air being circulated through a portion of the frame at approximately 150 degrees F. This high temperature softens the Saran in order that the fabric may be more easily stretched in the tentering process.

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School of Textiles

Begins Expansion Program

(Continued from Page 5)

1 36-Spindle Spinning Frame 4" Gauge—Whitin Machine Works

1 Model J Comber, Short Frame—Whitin Machine Works

1 Revolving Flat Top Card—Whitin Machine Works

1 4-Delivery Drawing Frame—Whitin Machine Works

1 S-L F S 2 Roving Frame—Saco-Lowell

1 S-L Lap Meter—Saco-Lowell

1 Set Flats for Card—Saco-Lowell

1 Worsted 10 x 5 Bobbin Roving Frame—Saco-Lowell

1 4" Gauge Worsted Spinning Frame—Saco-Lowell

1 36-Spindle Super-Draft Roving Frame—Whitin Machine Works

Long Draft Spinning Frame—Whitin Machine Works

Single-Cylinder Waste Machine—Kirkman & Dixon

1 40-Spindle Roto-Coner—Universal Winding Co.

Twister—H and B Machine Co.

Vacuum Stripping—Abberget Corporation

The Textile Management Department also falls into the well-rounded expansion program in that a large amount of equipment is being added to the Testing, Microscopy, and Costing Laboratories. The addition of this new equipment has greatly alleviated the need for more adequate equipment for the large numbers who must take these courses. Included here is some of the more important equipment which has been added to the Management Department.

9 Calculating Machines—Monroe Calculator Co.

1 Model J Tester for Cloth and Skeins—Scott Testers, Inc.

2 Microscopes—American Optical Co.

1 Microscope—Bausch & Lamb Optical Co.

2 Micrometer Discs—Bausch & Lomb Optical Co.

1 Marchant Calculating Machine—Marchant Calculating Machine Co.

1 Model A-2 Evenness Tester—Uster Corporation

1 Integrator for Model A-2 Tester—Uster Corporation

1 Pacific Evenness Tester—Anderson Machine Works

(Continued on Page 21)

WOODSIDE MILLS

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Greenville, S. C.

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1 Hardy Device—A. M. de La Rue

The preceding lists give only a part of the new machinery and equipment being added to the School of Textiles, but one does not have to be overly discerning to realize that the Clemson Textile School is rising to a position of even greater prominence throughout the textile industry.

As the textile industry continues its migration South, the industry will begin to turn more and more to the southern schools for graduates to fill positions calling for well-trained textile graduates. It is with this view in mind that Clemson has entered upon such an extensive expansion program, not only in the School of Textiles, but in all of the various schools here at Clemson.

Such a program is of prime importance to both Clemson students and to the firms or fields of endeavor which they will serve upon graduation. Clemson College is definitely on the upgrade and the School of Textiles is in the forefront of the impetus towards making Clemson famous as a "maker of men."

AATCC News

(Continued from Page 11)

each month was set for the regular meeting with other informal meetings to be held as considered necessary.

At the November meeting the student chapter enjoyed a very delightful dinner in the Purple Room of the new Clemson Hotel. On this evening, Mr. C. O. Stevenson of the Ciba Company was present as a guest ,and outlined the revised rules of the student paper contest to the group. This contest is sponsored by the Piedmont Section of the A. A. T. C. C. and original student papers are presented at the Spring meeting of the section. Awards are made based on the originality as well as the scientific and practical value of the work done. The first of these contests was held in Winston-Salem last year, and the Clemson chapter was very proud to receive first prize. The members of the section are working on several problems at the present time, and hope to make at least as good a showing as the papers of last year.

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"WHERE ALL CLEMSON MEETS"

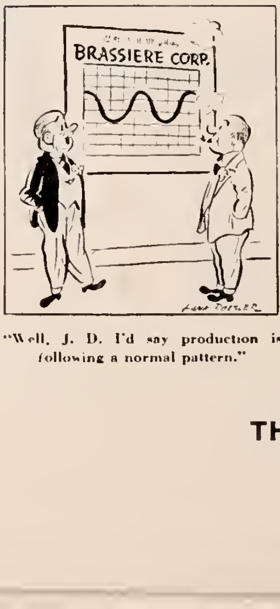
The BOBBIN AND BEAKER, official publication of the Clemson Textile School, announces the appointment of the new staff for the coming year. Retaining his post as Co-editor is Samuel P. Morrah, Textile Manufacturing student of Greensboro, N. C. and replacing W. M. Kirby as the other Co-editor is George A. Mobley, Textile Engineering student of Simpsonville, S. C. Walton B. Cassidy, Textile Manufacturnig student of Hartsville. S. C.. is the Managing Editor, with A. H. Clarke, Textile Manufacturing student of Laurens, S. C. as the Assistant Managing Editor. R. P. Boyd, Textile Manufacturing student from Charlotte, N. C. is remaining in his present capaciey as Business Manager, and R. J. Kay, Textile Engineering student from Trenton, N. J. is Advertising Manager. H. E. Batson, Textile Manufacturing student of Laurens, S. C. and P. V. Hazel, Textile Manufacturing student of Woodruff, S. C. are the Circulation Manager and Assistant Circulation Manager, respectivily
The following men have been appointed to the Editorial Staff: M. E. Price, TE, of Ninety Six, S. C., Bernie Fleischer, TM, of Waterbury Conn., W. H. Walker, TM, of Laurens, S. C., and W. C. Hayes, TM, of Dacusville, S. C.
Standing, Left to Right: C. E. Reddick, J. W. Christenbury, Walton B. Cassidy, R. P. Boyd, W. H. Walker, J. A. Mobely, A. H. Clarke, S. L. Hamrick. Seated, Left to Right: H. G. Batson, S. P. Morrah, Co-editor, A. E. McKenna, Faculty Advisor, W. M. Kirby, Jr., Co-editor, V. I. Lubash, J. F. Buxton.

Warp Ends

The farmer's daughter, now a city dweller, awakened one morning to find a note from her companion of the night before pinned to her pillow. The note read: "Goodbye, my little Hollyhock." She was puzzled so she looked in the Florists' Almanac and suffered quite a shock to her pride to read: "Hollyhock, . . . does well in fence corners and behind barns, but no good in beds."

"At last," groaned Buxton, "total paralysis of the left leg! I've feared it for years."

"If it will relieve your mind any," whispered the sweet and more or less demure thing on his left, "it's my leg you've been feeling."


BRASSIERE CORP.

"Well, J. D. I'd say production is following a normal pattern."

"You're not holding it right!"

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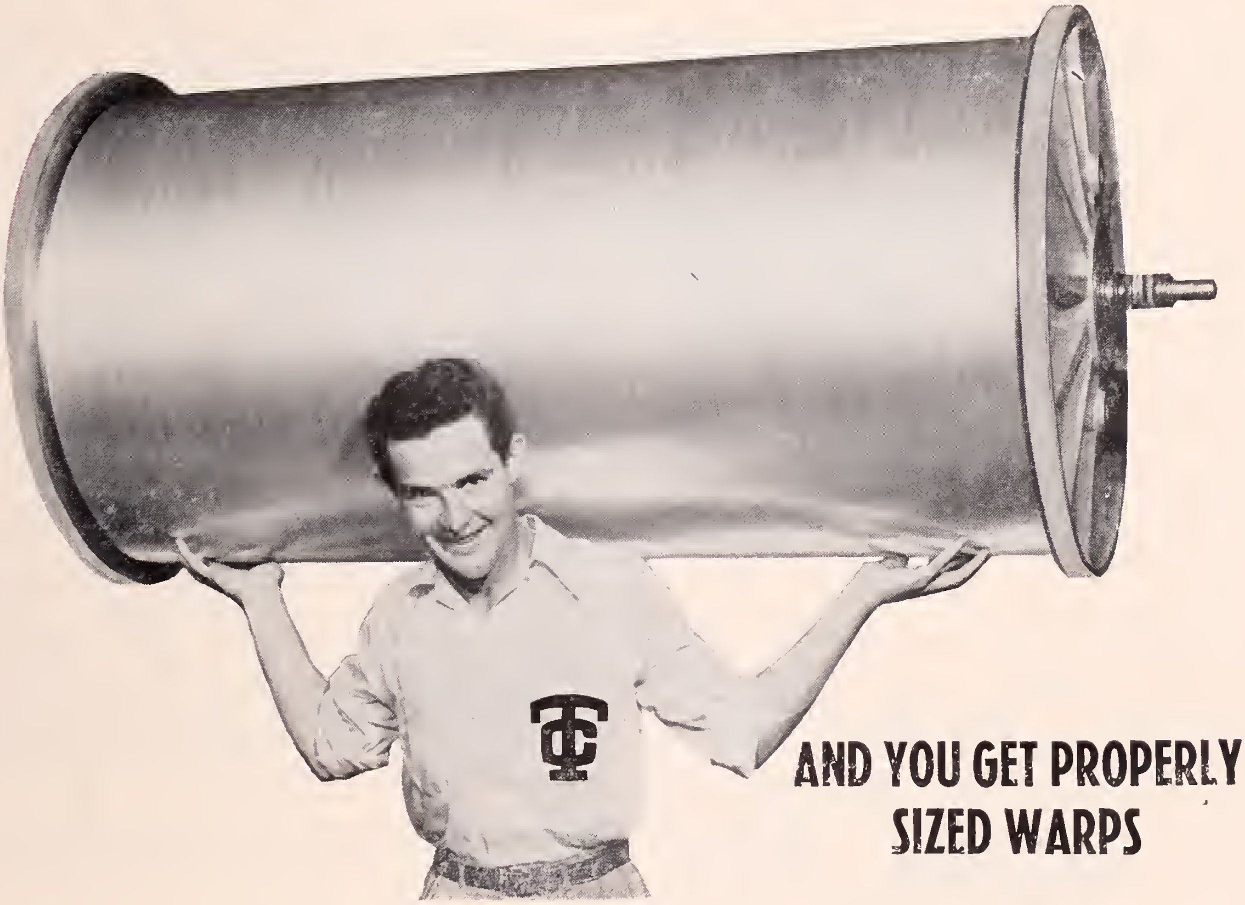

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As The Editor Sees It . . . . .

IS there need of a society for the purpose of furthering the interests of the Textile Manufacturing students? Comments of students and faculty members indicate that such an organization would meet with universal approval among the TM students at Clemson. Many of these students feel that Textile Engineering and Textile Chemistry students have advantages to better themselves socially and intellectually through the medium of the American Society of Textile Engineers and the American Society of Textile Chemists and Colorists—advantages which are of benefit to TE and TC students when applying for a position in the industry which they will serve—advantages which also give the TE and TC students an opportunity to remain in contact with friends whom they have acquired while undergraduates. The opinion has been expressed by many TM students that they are definitely interested in an organization such as the Textile Manufacturing Society of America. This organization or society would be molded along much the same line as other professional societies for Textile students. An organization of this type would be an asset both to the individual and the school for various reasons. First of all, it is my belief that any society which is organized for the purpose of brotherhood and fraternal associations is a great influence in promoting high ideals. Secondly, I believe that it would guide the ambitions of its members along more profitable lines than any course which might be included in any textile curriculum.

The Textile Manufacturing students, comprising the largest number in any one major, are, paradoxically, the only group which does not have a society to bring about a more intimate relationship. It is rather late in the semester, but I believe that there is ample time to make great strides toward activating such an organization. Mr. T. A. Campbell, Jr., Associate Professor of Textile Management, is very much interested in an organization of this type and has been appointed as the faculty advisor for the purpose of expediting the formation of this society. All sophomores, juniors and seniors seeking a B. S. Degree in Textile Manufacturing who are interested in this plan should contact Mr. Campbell at their earliest convenience.

ACKNOWLEDGEMENT

We are proud to accept the challenge of producing a publication that is worthy of representing the School of Textiles at Clemson. We wish to extend our appreciation to the advertisers who, through their interest, have made this publication possible. We are indebted to all who have contributed, advised, and worked with us on this issue. Furthermore, we wish to express our appreciation to every member of the Staff and Mr. A. E. McKenna, our faculty advisor, for their tireless effort to present a publication that will be of interest to the students, the Alumni, and the Industry.

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THE

BOBBIN & BEAKER

STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

SPRING ★ ISSUE ★ 1951

VOL. 9

NO. 2

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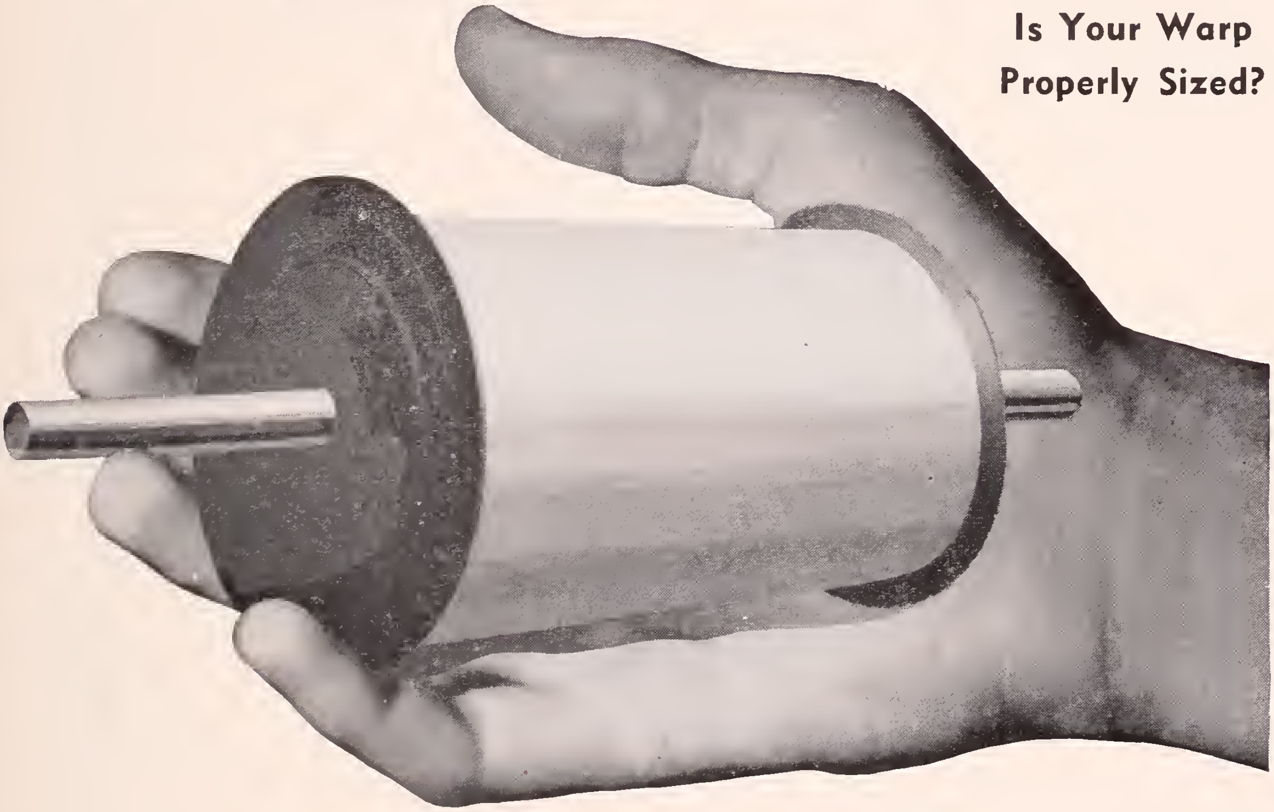

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The Cover

The cover shows Miss Jeannine Holland, the National Maid of Cotton on her tour of the Textile School. With her is Bernie Graham, escort from the college at large.

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National Maid Of Cotton Visits Clemson

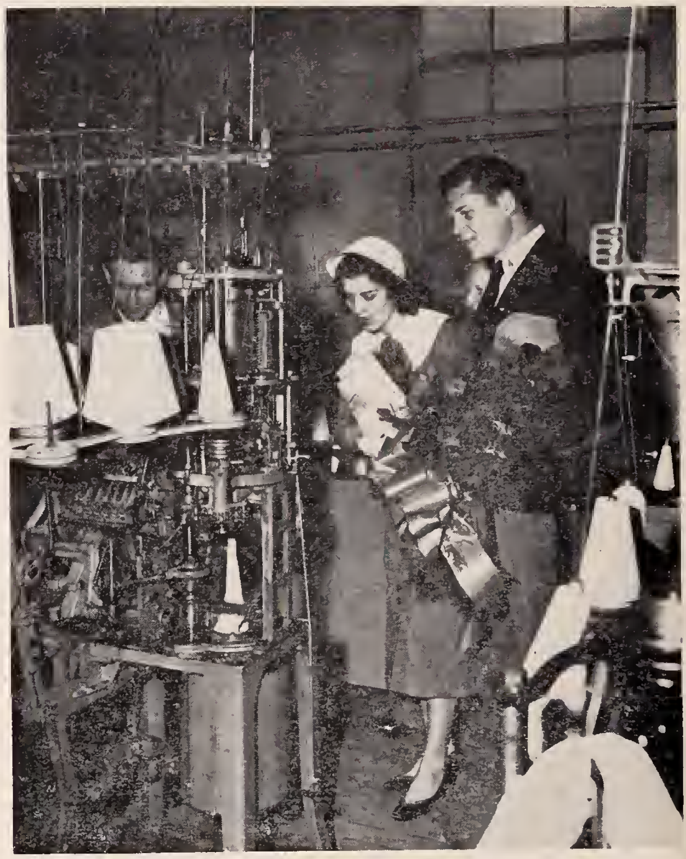
By Walton B. Cassidy

On Sunday, February 25, Miss Jeannine Holland, the 1951 Maid of Cotton arrived at the Greenville Airport to begin a long series of tours and personal appearances in and around Greenville, including a tour of the Clemson Textile School and campus. Elaborate welcoming services were held at the airport, and the Key to the City of Greenville was presented to Miss Holland.

The following day the Maid, along with her tour companions and the South Carolina Maid of Cotton, Miss Jean Neal, motored to Clemson to be viewed by 3,000 pairs of admiring eyes. Arriving on the campus about eleven o'clock in the morning, the two Maids were met on Bowman Field by an Honor Guard of Clemson Cadets and a welcoming committee composed of the school administration, including Colonel Cookson, Commandant, Dean Brown of the Textile School, and President R. F. Poole. Cadet Bernie Graham was selected as an aide to serve as Miss Holland's escort during the day's remaining activities on the Campus.

Immediately, Miss Holland and the touring group journeyed to the Textile Building where she and Miss Neal were welcomed by Professors Gaston Gage and Joseph Lindsay on behalf of the Textile School faculty; and Harry Batson, Henry Magill, and Walton Cassidy on behalf of the Textile students. Arm bouquets were presented to Miss Holland and Miss Neal by the student representatives.

A tour, conducted by Dean Brown, was then begun, and in the short time available all departments were hurriedly visited and points of interest were pointed out by the respective department heads. These professors really out-did themselves in showing off their various items and machines, but it is the opinion of the writer that Professor Allen, Head of the Knitting Department, won hands down. Mr. Allen was really turning out some production, and the ladies seemed fascinated by the whirling knitting machines. Perhaps Mr. Allen has something when he says, "Knitting is here to stay."



The Maid of Cotton looks over a knitting machine with Cadet Graham and Prof. Allen.

The party then retired to the College mess hall where Miss Holland and Miss Neal turned their attention to food and the boys turned their attention to the girls. Miss Holland then made a brief talk thanking the students for the welcome given her at Clemson.

That afternoon the two Maids were carried on a brief tour of the campus, even being taken for a ride in one of the tanks belonging to the Military Science Department. All too soon, time alloted for the Clemson tour ran out, and the Maid of Cotton and her party journeyed back to Greenville to begin another round of festivities there.

The American System Of Worsted Spinning

By: G. Edwin Taylor, T.M. '52

BEFORE recorded history man learned that he could twist, or spin, a series of fibres into yarn. The instruments used for this process were the distaff and hand spindle. With refinements in skill, incredibly fine fabrics were produced by the use of yarns made with the distaff and spindle. Through the centuries all fibers were spun by this method; the spinning wheel of Elizabethan England was only a device to permit foot power to free the operative's hands for the spinning operation.

With the development of power machinery changes were made permitting machines to be devised to spin yarns of certain character and length of staple. This resulted in different machines for the processing of wool and cotton, and variations for other fibers; for example, silk was prepared by reeling, doubling and twisting the natural thread of the silkworm.

Cotton and wool were the principal fibers produced during the last century, and machinery development followed these two fields. Until the last few years the process for these two fibers became relatively stabilized. Most of the machinery for processing fibers was invented in England. The cotton system was brought to America by Samuel Slater, and in this country it developed into the high-speed, low-cost system of today.

Cotton processing fell into two general groups of carded and combed yarns, while wool processing followed similar groups of woolen and worsted yarns. Woolen yarns and fabrics have a general characteristic of roughness due to the fact that the fibers are not parallel, and many short fibers project from the yarn in every direction. Worsted yarns and fabrics have the fibers more nearly parallel and the shorter fibers removed, resulting in a smoother, more even yarn. To the average textile man the woolen yarns are carded quality, and the worsted yarns are combed quality. The combed quality yarns, in both the cotton and wool systems, are the most expensive.

An article written for **Bobbin & Beaker**, the publication of the Clemson School of Textiles, Clemson College, Clemson, S. C.

The woolen and worsted systems, which were designed for machines with slower speeds and more doublings in the manufacturing process, are slower and more expensive than the cotton system. These two systems are the Bradford system, developed in the Bradford District of England and sometimes called the English system for this reason; and the French system, developed in France. Both systems were bodily moved to this country and have remained practically unchanged for almost a hundred years.

For years textile men have considered making worsted yarns on the cotton system, with its high production and low costs. Many experiments were made in this field, and very little success achieved. The chief reason being that cotton, with a fairly uniform staple length, required uniform settings; while wool, having a staple length from almost nothing to four or five inches, simply would not run on conventional cotton machinerl.

Some mills, by trial and error, made fair progress in producing worsted yarns and fabrics. One of these mills, Slater Manufacturing Company of South Carolina, under the management of Wyllys H. Taylor, a 1905 Clemson graduate, made a considerable amount of worsted yarn from especially selcted short top as early as 1934. This top was not stapled or cut to lengths, but run through drawing until a sliver of proper weight was obtained. Then it was processed as usual for cotton with all rolls set out as wide as possible. The yarn produced was not as even as regular worsted yarn and was used as filling in a cotton warp. This cloth was napped and used in light blankets. This system made creditable cloth and there were some advantages in it but not enough to create much enthusiasm.

With the introduction from Spain of Casablanca long draft spinning, a process which greatly helped control short staple, much progress was made by the few mills which experimented with the running of worsted yarns.

Newnan Cotton Mills of Newnan, Georgia, install-

(Continued on Page 22)

Dean Brown Attends European Textile Meeting

By Robert C. Bradley—TM-'51

DR. HUGH M. BROWN, Dean of the Clemson School of Textiles, left New York Friday for Europe where he will attend a series of textile and research meetings for the next six weeks.

The American Standards Association, as a member of the International Standards Organization, invited Dr. Brown along with 14 other delegates from the United States to make the trip. A highlight of the tour will be the ISO meetings in Bournemouth, England, June 4-9.

Dean Brown is representing the National Council of Textile Schools Deans, the American Society of Testing Materials Textile Committee D 13, and the Clemson College School of Textiles.

One of the important objects of the American Standards Association is to serve as the authoritative American channel for international cooperation in standardization work. The ISO is located in 29 countries.

Another objective of the group is to coordinate the different national standards to provide uniform international technical requirements.

While on the trip Dean Brown will be representing the same organizations at the International Research meetings in Lille, France, May 7-9 and at meetings of the Textile Institute of Great Britain, May 21-26.

Between meetings he will also attend the International Textile Exhibition in Lille, a project sponsored by the ECA, visit several textile organizations in Switzerland and other textile schools in England.

The Clemson Textile School has made great strides since Dr. Brown became its head. Many pieces of new machinery have been installed and the number of students have doubled.

DEAN H. M. BROWN
Of the Clemson Textile School.

Dr. Brown has had wide interest in the American Society of Testing Materials textile committee and other research organizations He has conducted considerable research for various task groups and given several papers.

Mrs. Brown is accompanying the dean on the trip. They are expected to return to this country on the S. S. Liberte the second week in June.

Good Housekeeping Habits Pay Off In Textile Mills

G. W. Ballentine, T. M. '53

Some people scoff at the idea of good housekeeping in textile plants. They think that their time has been wasted if they take the trouble to keep the plant in a clean orderly condition. This is a big mistake on the part of the mill officials. There are several mills throughout the country today that are producing first quality cloth, but it is amazing that they can do it, when one considers the cleanliness of the machinery and the mill in general. This type of mill may be producing a first class fabric, but the health of it's employees may become greatly impaired. Cases have been reported where skilled labor refused to work in a mill where filthy working conditions prevailed. This is detrimental to the company in many ways. The mill may lose skilled labor because of the sub-normal working conditions, and the workers who saw the bad working conditions of the mill may spread the word around. This may cause the mill to acquire a bad reputation and potential employees may become discouraged if they hear about it. The officials of an efficient textile plant should strive to keep their equipment and the mill in general as clean as possible, and the movement of the cotton through the various processes should be orderly.

Let's examine some of the other housekeeping problems that arise in the textile plant. In the picker room there are several difficulties that the overseer may encounter. Many mills have a surplus of picker laps that must be stored in order to conserve floor space. If a lap truck is available it is a good idea to place these laps on the truck. The lap truck may then be placed against the wall out of the way of the workers. These laps should be taken to the cards as soon as possible. With regard to the worker it is inadvisable to use a rack-type truck that carries six laps. The top lap that is placed on this type truck causes a strain on the worker and may result in a hernia. This type truck exposes the laps to human contact which results in excess waste. The width of the alley should also be considered. If you hang laps on a double truck it will take up approximately four feet of floor space. If the mill has narrow alleys it is a good idea to use the long truck in which the laps are placed vertically. The use of this type truck is advantageous because of the safety hazard and the waste problem. Many overseers have too many laps in the picker room, which results in the laps becoming torn on the ends and a loss of cotton due to waste. The production of the pickers should be regulated so that the card room can take care of all laps. This eliminates the necessity for storing the laps and the waste resulting from their storage.

Internal mill transportation doesn't receive as much attention as it should. Many mills have crude methods for moving cotton from one room to another. The card room presents a typical problem with relation to transportation. When the cans of sliver are moved, if there is no system for doing it, some of the sliver has to be taken out of the top of the cans. If this is not done, some of the sliver falls out of the top of the cans and into the path of the truck when it is moved. The result is wasted labor. If you cut the number of pounds per can it will also raise the cost. The answer to the problem is to have a truck with a rail high enough to hold the cans and have it finished with shellac so that it will not pick the sliver.

Many mills are confronted with the problem of how to handle the filling after it comes off the spinning frame. Overseers in various mills have solved the problem by having an area set aside for this purpose. The filling boxes should be placed in this area so that they will conserve floor space. If the boxes are stacked on top of each other four or five high the floor space can be properly utilized. If the mill has an excess of different types of filling, it may be beneficial to have a filling storage room. The room could be laid off in sections that would designate the filling type and blend. By having each

(Continued on Page 29)

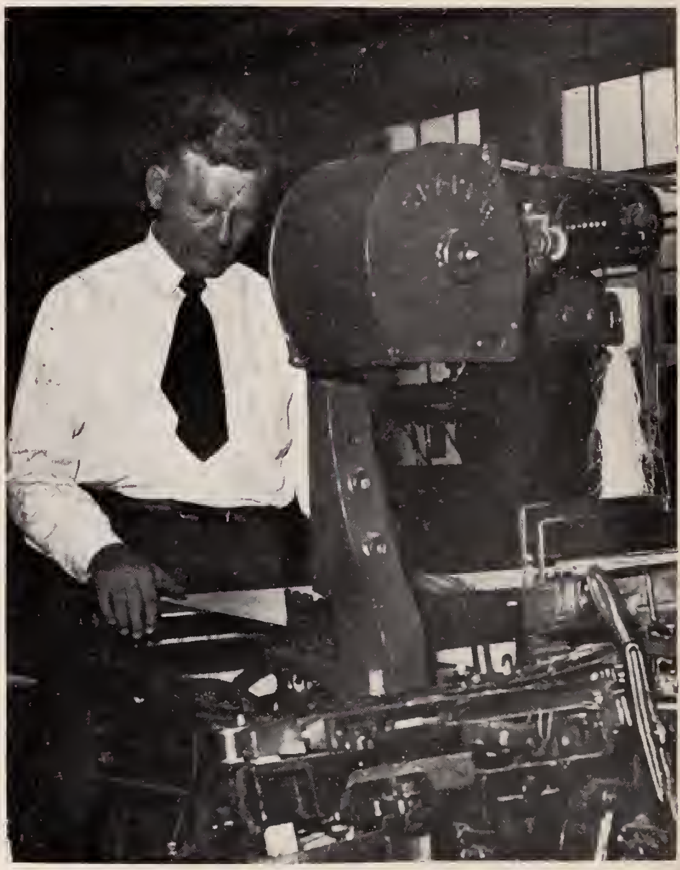
Professor Williams Writes New Laboratory Manual

THOSE of us who have taken, or have yet to take, a course in the study of Cam Looms will be interested to learn that Mr. W. Bratton Williams has recently written a new laboratory manual as a guide in the study of the loom. This manual has been in use at Clemson Textile School for the past two semesters, and also in the N. C. State Textile School for the same period of time. In addition a number of Textile plants in this area use it in their training programs.

Mr. Williams, a native of Greenville, S. C., is a graduate of Clemson College Textile School in the class of 1925. While there he took an active part in sports, playing fullback on the football team in 1922, 1923 and 1924. In 1922 he was the winner of the R. W. Simpson medal, being the first freshman ever to win this award. Following his graduation, Mr. Williams taught high school mathematics and coached all athletics at Simpsonville, S. C. and at Blacksburg, S. C.

After this brief teaching experience, he started his textile career in the weave room of the American Spinning Co., in Greenville, S. C. He remained there for three years and then accepted a position teaching textiles at Calhoun Mills in Calhoun Falls, S. C. Mr. Williams was then the overseer of weaving at Calhoun Mill and later at Gossett Mill in Anderson, S. C. In 1939, he joined the textile faculty at Clemson College. To get his Masters Degree, he attended Penn. State College in the summer session of 1939 and 1940. He finished work on his degree and received it at Clemson in 1950.

The thesis that he submitted to secure the degree was the laboratory manual mentioned previously. This study guide on the cam loom mechanism required a year to complete. In the manual, the loom is broken up into twenty-eight exercises which cover two semesters work. Step-by-step instructions for removing parts of a particular motion, studying the parts while they are off the loom, and then replacing and resetting them on the loom are included. It is believed that this is the best method to employ in the study and understanding of the mechanical operation of the various parts. By this method, practically the entire loom is studied motion by motion, until gradually the student becomes familiar with the loom and acquires a fundamental knowledge of its mechanisms.



MR. BRATTON WILLIAMS
In Cam Loom Lab

Highlights Of The German Textile Industry

By Claus Schulz-Nadler and George A. Mobley

Since the war, industry in the Western Zone of Germany has been reconstructed to almost the prewar level. This has been made possible by American funds distributed through E.C.A., and the Marshall Plan.

A brief glance at a few statistics will show that the textile industry is near the top in the reconstruction program. Using the year 1938 as a basis of 100%, the tutput of German industry as a whole had reached 94% in 1950. This figure includes all branches of the textile industry. To quote a few absolute figures, textile exports in 1949 totaled $1,810,000,000, against $2,400,000,000 for 1936.

The textile industry in the Western section is concentrated in the states of Westphalia and the Rhineland in the northwest part of Germany, and in Bavaria and the Black Forest near the Swiss Boundary. The majority of the knitting industry in the Western zone is located in the Black Forest. After the war, the hosiery industry moved from the Eastern zone to the West, where production was started with machinery chiefly imported from America.

The manufacturing processes in German Textile mills closely follow those used in the United States. In some of the larger plants, controlled draft drawing and long draft spinning eliminate two or three processes of roving. As in the United States, only one process of roving is used for coarser numbers of yarn, while two or more processes are used for fine numbers and combed yarns. One notable difference between American and German industry is that the Germans have few integrated companies. That is, the spinning mills are usually separated from the weaving companies.

Among the spinning frames used are those made by the Ingolstadt Company in Bavaria, and Rieter machines made in Switzerland, as well as English frames. The new Ingolstadt spinning frames are well built and are widely used in the reconstructed spinning mills. In recent years, the machine shops in the Russian Occupation Zone have moved to the West and are now putting their first western products on the market.

Mr. Schulz-Nadler is a native of the state of Westphalia, in northwestern Germany. He attended school in his home town, and served in the German army during the second world war. After the war, he attended the Technical College of Reutlingen, in Wurttemberg, where he majored in Textile Engineering.

Mr. Schulz-Nadler is now in the United States to study American methods of production and quality control. His first study was done in Texas, where he studied marketing practice and fiber testing. He is now at Clemson for the purpose of studying manufacturing processes and the methods of maintaining quality production by various methods of testing.

The Swiss frames are also very fine machines and are built with typical Swiss precision. They are fully automatic, insofar as a spinning frame can be automatic, and have gears and other moving parts enclosed as much as practical. Because of this precision workmanship and enclosing of parts, they run very quietly. However, maintenance presents a problem because of their intricacy. Many spinners producing combed yarns prefer the Rieter frames, but it is a common practice to send a fixer from the mill to the Rieter plant to study the machines before he takes over the maintenance of the frames in the mill.

The question of obtaining raw materials is a very important one to the German textile industry. In 1950, there were 5,217,991 spindles reconstructed and ready to run, but, due to the scarcity of raw stock, only 5,020,778 could be put into production. The waste obtained from the production of high quality wool, cotton and rayon goods is reprocessed, and spun into coarse yarns. This spinning is usually done on mule frames.

Since the war, German industry has realized the importance of fiber testing and production and quality control, so many mill managers have come to the United States to study the solutions obtained by American mills. Since German production is chiefly for export, quality is the main interest. They

(Continued on Page 19)

Linthouse Personalities . . .

By A. H. Clarke '52

To most of you upperclassmen and alumni this article will hold no news, but for the benefit of many freshmen and some sophomores these few words will acquaint you with three familiar personalities frequently encountered about the Textile building. No doubt all of you have at some time seen these men working at one of the many jobs which they perform. Seeing these men on different jobs from day to day, you probably wonder just what they do and how long they have been associated with the textile organization here at Clemson. This writer hopes the following summaries will enlighten and familiarize you with these men.

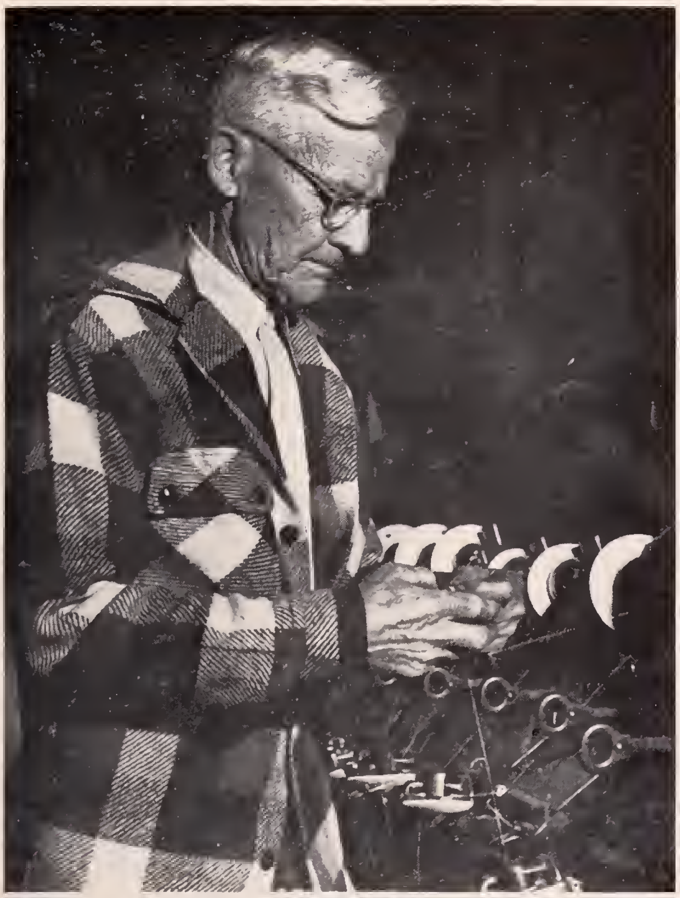
MR. "PAT" WHITTLE

MR. JOHN WILLIS

PAT WHITTLE

One of the most congenial and well liked personalities around the Textile building is "everyone's friend", Pat Whittle. To most of the old grads Pat is unfamiliar, having come to Clemson in September of 1936. Before bringing his services here, he was employed at Oconee Mills in Westminster where he held the position of second hand of the card room for eleven years.

While talking to Pat, I asked him just what his job was at the T-building. This gave him the open-



MR. WHIT DILLARD

ing for which he had so eagerly awaited, so he came forth with the title, "Mechanic of the Yarn Manufacturing Department." However, he was doing plumbing work in the basement at the time of this interview. He must have sensed that I was about to laugh at his big title so he retorted, "I'm really a fox hunter by trade." Fox hunting is all right, Pat, but just be sure you don't fall into any old wells.

During my three years stay here at Clemson, I've found that Pat hasn't changed much except in one respect—he has a new set of 'store-bought" teeth. Just catch that big smile sometime and see for yourself.

JOHN D. WILLIS

Mr. Willis became affiliated with the Textile Department at Clemson August 1, 1928. Mr. Willis, known to the students as "Mr. John", is the man you see setting the looms that are sometimes almost past running. He is connected with the Weaving Department and included in his "fixing", besides the looms are the winders, slashers, and warpers. Not included in these little sidelines are his jobs in plumbing and steamfitting that are done in the linthouse. From this assortment of tasks one can readily term "Mr. John" as a "jack of all trades". This is precisely the term he used when interviewed with an added appendage—"jack of all trades and good at none". However, we are inclined to disagree with the latter part of this statement. When a man can get a loom to run after some of these sophomore "loom-fixers" get through with it, he has to be good at something; either loom fixing or praying and perhaps both.

J. WHIT DILLARD

The Dillard brothers have seen many boys come and go at Clemson. One has been associated with the laundry for forty-six years and another teaching arc welding during the same period.

The third brother is "Mr. Whit" who became connected with the Textile Department in December, 1903. At this time each building had a separate boiler room and 'Mr. Whit" was in charge of the one in the present Physics building which was formerly the Textile building. When the machinery was moved to the present location, he aided in this operation.

Prior to being employed by the Textile Department, Mr. Dillard worked in the Veterinary Hospital here at Clemson for two years.

If any of you students want to know any facts pertaining to the early history of Clemson, just ask an old hand like "Mr. Whit'; he can tell it all.

Instructor Added To Textile Faculty

By Bernie Fleisher TM-51

The newest addition to the Textile School faculty, Mr. Thomas Efland, comes from Efland, N. C., a little town named for his grandfather. After graduating from Efland High School, Mr. Efland went to North Carolina State College to study textiles. His stay at State was interrupted by two and one-half years of service in the Army Airforce. During his time in service, he served as a Flight Engineer on B-29's.

Upon receiving his discharge from the Army, Mr. Efland returned to N. C. State, where he graduated in June, 1949. From State, he went to the North Carolina Vocational Textile School as an instructor in Knitting. He remained there until he came to Clemson during the first part of this semester.

Mr. Efland is now teaching both elementary and advanced knitting courses—WD 309, WD 312 and WD 412. Mr. Efland is married and has two boys, Jimmie and Tommie. He lives in the Clemson Homes at Apartment 25-B.

Course In Throwing Added To Textile Curriculum

W. Clyde Hayes, TM-Aug. '51

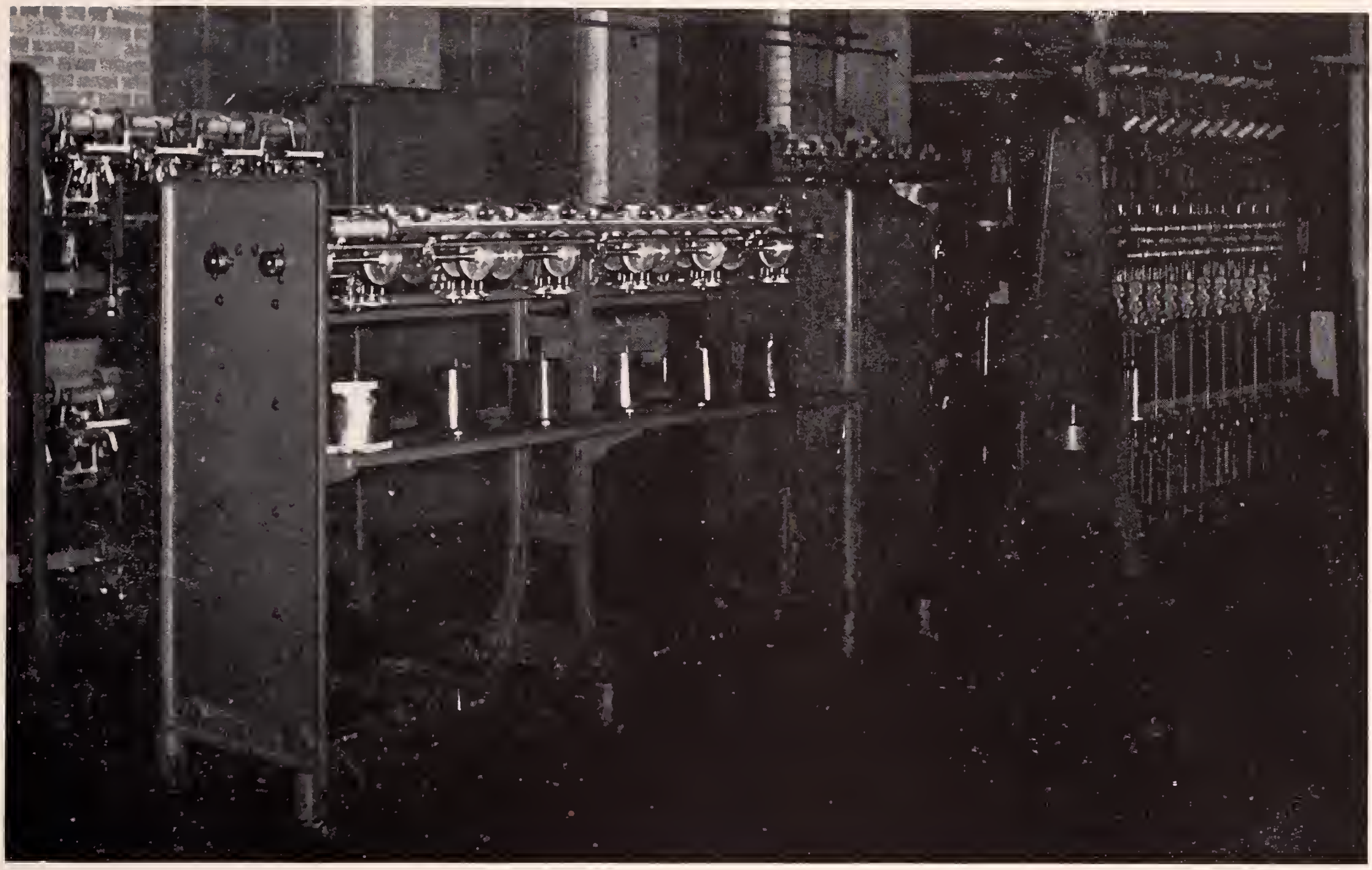
THE course most recently added to the textile curriculum is Throwing, W.D. 404. Throwing, a term which originally came from the silk industry, means to twist yarn. When rayons first came on the market they were called artificial silk. Since these synthetics were processed on silk equipment, the filament rayon industry consequently fell heir to nomenclature applied to the silk industry.

In view of the fact that the synthetic industry is moving into the South in general and South Carolina in particular, there has been displayed a definite need for men who have a knowledge of the preparation and handling of filament synthetics prior to weaving. Furthermore, since the textile school was already equipped to slash synthetic warps and weave synthetic fabrics, this was the logical course to round out the curriculum and make available machines necessary for the twisting and doubling of yarns to form voile, crepe and combination yarns.

The course itself is set up to cover the preparation of suitable yarns for specified fabrics from the soaking process through warping, depending upon the requirements of the fabrics. Some of the fabrics for which the yarn preparations are covered are combination-yarn fabrics, flat crepes. French crepes, voiles, ninons, taffetas, triple sheers, satins, marquisettes, tricot and hosiery. Studying the preparation of yarns for a specific style of fabric, the student is given a list of the possible constructions and the yarns that may be used in that fabric. For example, under the heading of combination-yarn fabrics, the sley may vary from 36 to 72 ends per inch and the filling from 34 to 54 picks per inch. The yarns used will generally be from 75 to 150 denier crepe plied with an end of 100 to 150 denier acetate, these yarns being generally of 'S" twist and the same yarn being used in both the warp and filling of the fabric. One of the fabrics is then chosen for a detailed study and a style specification sheet prepared. The information generally found on the style specification sheet is of such a nature as to contain the types of yarns in both the warp and the filling, the width in the loom, the width off the loom, the number of ends and picks per inch, the yards per pound and other information that might pertain to this fabric. From this information a flow-chart is prepared which will designate the processes that will be used in the preparation of the yarn for the specific fabric. A detailed study is next made of each of the processes used, including

Yarn conditioning unit of the new throwing equipment.

Twisters and Winders For Synthetic Yarns



soaking bath preparations, methods of tinting for identification, extracting, dying, twisting, twist setting, tensions, machine speeds, and the relative humidities at which each of the foregoing processes should take place.

The equipment of the chemistry department has been made available for the soaking and extracting of these yarns which are to be so processed. Machines available for use in this course are: a chest dryer, recently presented the Textile School by Judson Mills; a 12 spindle high speed spooler, capable of handling bobbins, cakes, cones, pins or skeins and capable of producing packages up to one pound with production speeds from 200 to 750 yards per minute; a 16 spindle face drive twister which accurately builds up yarn into tapered or straight-end headless packages ranging from 8 to 32 ozs. using bobbins or perforated spools; a 40 spindle double deck twister for accurate high speed twisting of the finest of deniers—silk, rayon, nylon, etc. to 8 to 16 oz. take-up spools; a 20 spindle double twister for plying of combination yarns combining from two to twelve ends of yarn. These machines were donated by the U. S. Textile Machine Company of Scranton, Pennsylvania.

In addition to the foregoing machinery, the school purchased an "H-W" Conditioner for twist setting operations; one No. 350B Nylon Sizing machine for use in the single end sizing of nylon yarns for knitting, which winds the nylon on tubes for direct supply to the No. 50 pineapple coner. In addition, a No. 50 precision winding machine with the pineapple coning attachment is on order, this machine being capable of producing a package which is wound on a 4°30' paper cone and having a mechanism which shortens the traverse as the cone increases in diameter, the results being a cone with tapered ends; a Sipp-Eastwood Warper with a spool creel has been donated by Judson Mills for the warp preparation of crepe and combination-yarns for weaving.

While the number of students taking this course is limited, it is expected that next year both facilities and class time allotment will be expanded to such an extent that there will be sufficient room for all students desiring to take such a course. It is hoped that this course in Throwing will be of real benefit to the students, industry and the Textile School.

Where Are They Now . . . ?

Harry G. Batson '51

An article written for **Bobbin & Beaker**, the student publication of the Clemson School of Textiles, Clemson College, Clemson, S. C.

Spring again; then June and graduation. Once more Clemson will be sending young men into the textile world, a world that holds unlimited possibilities for the trained, ambitious man. Many changes have been made in the past few years to make textiles one of the leading industries in the South, and this dream or goal of so many textile men, is within sight. Each year the industry is expanding more and more and doing their bit towards this progress are numerous Clemson men.

Former graduates? The industry is full of them and Clemson's Textile Department is justly proud of their work. Among former graduates at Tennessee Eastman Company in Kingsport, Tennessee, are: T. R. Bainbridge, Class of '39, Supervisor; J. E. Blessing, Class of '41, Mechanical Engineer; P. J. Burns, Class of '40, Textile Engineer; J. W. Dickert, Class of '35, Supervisor; C. F. Earnhardt, Class of '33 Supervisor; R. C. Forrester, Class of '40, Textile Engineer; W. W. Gignilliat, Class of '48, Chemical Engineer; W. L. Hicks, Class of '31, Chemist; E. E. Holt, Jr., Class of '48, Correspondent; J. J. Kirton, Class of '39, Supervisor; J. C. Owenby, Class of '48, Chemist; F. B. Pollard, Class of '32, Service Representative; H. W. Smith, Class of '37, Service Representative; D. R. Stokley, Class of '38, Chemical Engineer; G. W. Toncray, Class of '34, Foreman-Color Laboratory; A. L. Thompson, Class of '50, Physicist; Robert Hester, Class of '39, Chemical Engineer; T. W. Lewis, Jr., Class of '50, Chemist. At The Russell Manufacturing Company in Alexander City, Alabama, there is one former graduate. He is W. H. Crout, Class of '31, employed as Cloth Designer. Clemson men presently employed at Pelzer Mills in Pelzer, are: J. W. Blythe, Jr., Class of '50, Mechanical Draftsman Clerk; D. W. Quinn, Jr., Class of '47, Assistant Overseer Spinning; W. M. Simpson, Class of '37, Mechanical Superintendent; W. H. Taylor, Class of '26, General Superintendent. At Roanoke Mills in Roanoke Rapids, North Carolina, there is one Clemson man. He is E. H. Fuller, Class of '38, Assistant Superintendent. Presently employed at the Springs Cotton Mills in Kershaw, South Carolina, are: T. C. Hegler, Class of '42, Second Hand; Leo Fisher, Class of '49, Second Hand. In Pepperell, Alabama, employed at Pepperell Manufacturing Company, are two graduates: C. B. Ray, Head Chemist; C. A. Reese, Overseer of the Inspection and Packing Department. Presently employed at Abbeville Mills, Abbeville, South Carolina, are: R. H. Ashley, Class of '51, Finished Grader; F. D. Benson, Class of '39, Overseer Spinning, Winding, and Twisting; P. W. Bethea, Class of '38, Production man; J. A. Botts, Class of '42, Industrial Engineer; R. L. Calvert, Class of '48, Second Hand Top Dyeing; J. P. Carwile, Class of '49, Laboratory Teachnician; E. L. Davis, Class of '49, Production Planner; G. R. Dusenburry, Jr., Class of '48, Overseer Cloth Preparation; R. C. Edwards, Class of '33, Treasurer; J. C. Fair, Class of '48, Production Clerk; T. D. Ferguson, Class of '40, Superintendent of Weaving; W. C. Gilmore, Jr., Class of '42, Designer; C. J. Glenn, Class of '43, Superintendent of Preparation; R. F. Hawthorne, Class of '49, Assistant Industrial Engineer; R. A. King, Class of '40, Overseer Finished Cloth; R. A. Link, Class of '42, Overseer Top Dyeing; G. M. Moisson, Jr., Class of '49, Chemist; R. E. Norwood, Class of '49, Production Planner; M. V. Poole, Class of '49, Second Hand Cloth Preparation; M. Y. Quarles, Jr., Class of '48, Second Hand Preparation; T. J. Reames, Class of '23; Personnel Manager; R. M. Rochester, Class of '49, Laboratory Technician; J. C. Simmons, Class of '46, Cost Accountant; H. E. Thompson, Class of '49, Production Clerk; G. D. Ware, Class of '50, Dyers Assistant; W. W. Webb, Class of '35, Overseer Dye House; Jerome Wilson, Class of '49, Second Hand Finishing. At Cannon Mills, Kannapolis, North Carolina, are: F. O. Griggs, Class of '36, Assistant Purchasing agent; George Griggs, Class of '50, and Malcolm Bishop, Class of '50, are working in the manufacturing part of the business; W. B. Thomson, Class of '33, Overseer of

Finishing; J. R. Wallace, Class of '48, Civil Engineer; M. C. Propst, Jr., Class of '40, Assistant Laboratory Director; E. S. Hunsuck, Jr., Class of '48, Chemist; J. H. Cannon, Class of '37, Personnel Director. At Avondale Mills, Sylacauga, Alabama, are: W. A. Turner, Vice President and General Superintendent; J. H. Pasley, Superintendent; J. E. Warren, Vice President and Purchasing Agent; W. J. McKemie, Supervisor of Cost Department; L. O. Todd, recalled to active duty with Army Air Force in July, 1950; H. M. Clark, Superintendent of Pell City Plant, Pell City, Alabama; W. D. Windsor, Utility.

H. Barrow Turner, Class of '47, Superintendent of Magnolia Cotton Mills, Magnolia, Ark., was called to active duty from the Marine Reserve Officer's Corps last July and after a few brief weeks of refresher courses was sent to Korea as a 1st Lieutenant in command of a Task Unit attached to the 7th Regiment of the 1st Marine Division. It is with the greatest regret that we report to you that on November 29, 1950, he was taken prisoner of War while serving with his unit on the Northern end of the Chongsin Reservoir Basin at the time the entire Marine 1st Division was encircled by the Chinese Reds. The only information received since his capture is that he was alive and un-injured at the time of his capture. Lt. Turner served in the Pacific during World War II and received both the Purple Heart and the Silver Star for gallantry in action.

Employed at Union-Buffalo Mills, Union, South Carolina, are: C. E. Carson, Class of '50, serving in the Apprentice Training Program; H. H. Cosgrove, Jr., Class of '39, Personnel Manager; G. S. Davis, Class of '48, Foreman of Spinning; H. L. Dunlap, Class of '49, Machinist; R. Y. Hamrick, Class of '50, Head Loom Fixer; J. E. Smith, Class of '50, Foreman in Cloth Room; W. E. McSwain, Class of '49, Foreman of Spinning; H. W. West, Class of '50, Trainee. Presently employed at Chicopee Manufacturing Corporation, Chicopee, Georgia, is J. T. Wigington, Jr., Class of '48, recently transferred from Standards Department to the Mechanical Department as a trainee under the Plant Engineer. Frank Haddon was transferred to the Cornelia, Georgia, Lumite plant last year. Walter Crenshaw was transferred to the Athens, Georgia, plant early this year. Both had worked at Chicopee. Orr Cotton Mills, Anderson, South Carolina, presently has four Clemson graduates. They are: J. J. Lyons, Class of '25, Executive Vice President and General Manager; G. C. Jolly, Class of '40, Card Room Overseer; G. A. Glenn, Class of '48, Personnel and Engineering Director; R. W. Roberts, Class of '50, Trainee. Working for American Enka Corporation, Enka, North Carolina, are: E. M. Salley, Jr., Class of '27, Plant Manager; Lawrence Hart, Class of '31, Research Textile Engineer; J. E. Spearman, Class of '48, Research Textile Engineer; R. M. Stribling, Class of '29, Dye Technician; C. C. Robinson, Jr., Class of '49, Technician Supervisor; W. W. Abbott, Class of '42, Manager Textile Laboratory, Lowland Plant. Employed at Darlington Manufacturing Company, Darlington, South Carolina, is T. M. Champion, Class of '39, Industrial Engineer. Among the Clemson graduates at McCormick Spinning Mill, McCormick, South Carolina, are: B. C. McWhite, Class of '47, Office Manager; F. P. Deason, Class of '51, Trainee. At Johnston Mill, Johnston, South Carolina, are: H. S. Ackis, Class of '41, Second Hand in Weave Room; W. B. Sawyer, Class of '51, Production Clerk.

In the Burlington Mills chain we find many Clemson graduates. Among them: Ernest Abernathy, doing experimental work in Burlington, North Carolina; Howard Arnold, Weave Room Supervisor at Johnson City, Tenn.; Ruskin Arnold, Superintendent at Radford, Virginia; Jim Austell, Weave Room Supervisor at Altavista, Virginia; Earle Aycock, Superintendent's Detail at Altavista, Virginia; Alex Ball, Superintendent at Swan Ribbon Plant in Catasauqua, Pennsylvania; W. H. Ballard, Superintendent at Altavista, Virginia; W. F. Barnes, Assistant Superintendent in Bristol, Tennessee; Roy Bobo, Assistant Superintendent in Lexington, North Carolina; Robert Bonds, Supervisor of Weaving in Cordova, North Carolina; Harry Cannon, Assistant Superintendent at Vinton, Virginia; C. E. Crutchfield, Division Manager at Greensboro, North Carolina; Robert Duckworth, Supervisor of Spinning at Johnson City, Tennessee; E. W. Dunham, Overseer at Royal Swan Plant, Hatasauqua, Pennsylvania; J. L. Eskridge, Devel. Coord. in Greensboro, North Carolina; Fred Finley, Superintendent at Burlington, North Carolina; John Gaddy, Apprentice in Weave Room at Cordova, North Carolina; Noel Garvin, Weave Room Supervisor at Franklinton, North Carolina; J. E. Garvin, Division Manager, Filament Division at Greensboro, North Carolina; Tom Graham, Supervisor of Weaving at Radford Virginia; Riggs Goodman, Weave Room Supervisor at Cordova, North Carolina; M. L. Hanna, Superintendent at Mooresville, North Carolina; Harold Hatfield, Shift Dyer at Greensboro, North Carolian; David Kennemur, Superintendent of Finishing at Cramerton, North Carolina; Wesley Lee, M & S Supervisor at Burlington, North Carolina; Bill Little, Preparatory Overseer at Burlington, North Carolina; O. K. McCartney, Assistant Superintendent at Burlington, North Carolina; Joseph McMahon, General

(Continued on Page 25)

How To Write A Letter Of Application

George A. Mobley, TE-'52

AT some time during his active working career, almost everyone has to write a letter of application. The man who can write this type of letter without a great struggle is rare. Usually, the writer does not know what to say, and when he figures that out, he doesn't know how to say it.

Any executive will say that the successful letter of application has no set form. However, there are several points to remember. First, type the letter, or have it typewritten. As in schoolwork, typing pays off in the end. If you have to write, though, use dark ink on plain paper. Make your letter neat and readable.

Second, find out whom you want to receive your letter. You are trying to make a hit with some one person in the firm, and you will make much better progress if you address him by name. It shows that you are really interested, and that you have gone to some effort.

A third point is to use good English. Don't be stiff or too formal, but don't lapse into incorrect grammar and colloquiaisms. Avoid pedantry. Just because you have been to college and know some big words, don't try to use them where simpler words suit much better. Be brief and to the point, yet explain yourself fully. That is hard to do, but it can be done.

The fourth, and by far the hardest, point to make is saying the right thing. Do not beg for a job. Make it seem to be to the advantage of the company to put you to work, but be subtle about it. Remember, you are selling yourself and your services. State your capabilities, but do not brag about them. Express willingness to work for a trial period to find out if you and the company are compatible. Make yourself available for an interview at the convenience of your prospective employer. If you have a preference as to time, don't be afraid to say so, but don't limit it to your own convenience.

Lastly, you should give your previous experience, scholastic background, and any other information which you think might interest your reader. A college diploma isn't an infallible document which will make it possible to get any job you may apply for, but it will probably be a big help.

Now, after having read this article, calmly throw it in the waste basket, and forget it. You probably already have a good job, and I am still writing letters of application.

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Dear Ruth:

I just read in the paper that students who don't smoke make much higher grades than those who do. This is something for you to think about

Love,
Father.

Dear Father:

I have thought about it. But truthfuly I would rather make a B and have the enjoyment of smoking; in fact I would rather smoke and drink and have a C. Further more, I would rather smoke, drink, neck, and make a D.

Love,
Ruth.

Dear Ruth:

I'll break your neck if you flunk anything.

Love,
Father.

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"Yes, Ma!"

"How many times must I tell you that a cuspidor is to spit in?"

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"Atomic" Wray

"As I said before, . . .What did I say before?"
"Young John" Edwards

"A Junior and you don't know that?—boy, you've missed half of your education!"
"Uncle Bud" Cartee

"That's right—huh!"
"Doc" McKenna

"It's not the big things, but a multitude of the little-bitty-little ole things."
"High-pockets" Gage

"If you drop your pencil in this course, you will be two weeks behind. Next page!"
"Speedball" Campbell

"Boy-ys, I sure have got troubles."
"Crowfoot" Tarrant

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Highlights Of The German Textile Industry

(Continued from Page 9)

cannot compete with the American mills in quantity produced, so they have to strive for highest quality.

As mentioned before, spinning and weaving are usually performed by separate companies with only the largest concerns having both. Many of the new mills being built are constructed along the lines of newer American mill buildings, with no windows, fluorescent lighting, and complete air conditioning. Practically all the older mills have been converted to fluorescent lighting.

As in America, the current trend is toward individual drive for textile machinery. All mills in Germany use electricity as a main source of power. In the mountain sections where water power is plentiful, the mills generate their own power, and in the Ruhrgebiet, near the coal fields, mills have their own steam-driven generating plants. However, most mills buy some part of their power from commercial power companies.

In Germany, as elsewhere in the world, the cost of living has risen in recent years. Again taking the year 1938 as 100%, in 1949, the cost of living was 167.2 per cent, and in 1950 it was 154 per cent. The wage scale in the textile industry is slightly different for men and women. The average wage of a woman textile worker was 92.9 D-Pfennig per hour in 1950, while men averaged 119.3 D-Pfennig an hour. It is easy to compare these figures with American money, since 100 D-Pfennig make 1 Mark, and a dollar is worth approximately 4.2 Marks. Therefore, a woman makes about 22.1 cents an hour and a man makes about 28.4 cents. These figures seem low compared with American wages, but they are in line with the wages in Germany as a whole.

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Textile Club Activities

Phi Psi

By George A. Mobley TE-'52

After the initiation held April 14, Iota chapter has a membership of thirty-eight men. Fourteen new members were initiated, including 11 Seniors, 2 Juniors, and 1 Sophomore. The new members are W. D. Asnip, A. A. Bissell, R. E. Bowen, R. P. Boyd, R. A. Bridges, H. L. Brockman, J. L. Childress, F. C. Hoffman, G. W. Jones, J. M. Niver, P. R. Osborne, M. E. Price, F. L. Watt, and F. M. Welsh.

HONORARY MEMBER

On January 4, of this year, the members of the chapter enjoyed a steak supper at Seigler's Steak House in Walhalla, S. C. After the supper, those present returned to Clemson, where honorary membership was conferred on Mr. Lake Hugh Jameson. Mr. Jameson is a graduate of Clemson, and after spending several years in the textile industry, he has become an Instructor in Weaving and Designing in the Clemson School of Textiles.

BANQUET HELD

On April 27, the annual Phi Psi Banquet was held at the Ottaray Hotel in Greenville, S. C. An address was made by Mr. W. A. L. Sibley, Vice-President of Monarch Mills at Union, S. C. Mr. Sibley spoke on the subject of "Religion in Business." Mr. Walton Cassidy, President of Iota Chapter, acting as Master of Ceremonies, gave a brief summary of Chapter activities and introduced the new officers. Mr. Sibley was introduced by Mr. John Wiggington, Director of the American Cotton Manufacturer's Institute office at Clemson. The banquet was a great success, and everyone had a wonderful time.

NEW OFFICERS

At a regular meeting April 14, new officers were elected to preside over the chapter for the coming year. Edward E. Cothran was chosen as President. with Alvin H. Clarke, Vice-President, Furman Leroy Watt, Senior Warden, and Luther J. Sigmon, Junior Warden. George A. Mobley, present Secretary-Treasurer, was re-elected in the same capacity. The retiring officers are Walton B. Cassidy, President; W. Clyde Hayes, Vice-President; William G. Raines, Senior Warden; and Bernie Fleisher, Junior Warden.

NATIONAL CONVENTION

Mr. Walton B. Cassidy and Mr. Edward E. Cothran attended the annual Phi Psi National Convention as delegates from Iota Chapter. The Convention was held May 4, 5 and 6, in Sarasota, Florida. Our display represented all departments at Clemson, and we feel that it showed a good cross-section of the products of each department. The display won the second prize of fifty dollars.

PHI PSI MEMBERS RECEIVE AWARDS

At Scholarship Recognition Day exercises May 2, four Phi Psi men were honored with awards and scholarships. Walton Cassidy, member of Phi Eta Sigma, Phi Psi, and Phi Kappa Phi, received the Phi Eta Sigma key awarded to the graduating Senior with the highest scholastic standing in Clemson. He also received the National Cotton Manufacturer's Association award for the student doing the most outstanding work in textiles.

Walter L. Thompson, Textile Chemistry Major from Belton, S. C., received the American Association of Textile Chemists and Colorists award for the most outstanding work in Textile Chemistry. Last year, Mr. Thompson received the annual Textron Scholarship awarded to the Junior majoring in textiles with the highest scholastic average.

The annual Phi Psi award for this year went to Mr. James F. Cathcart, who graduated in February. The Phi Kappa Phi award to the Junior with the highest scholastic record went to George A. Mobley.

National Textile Manufacturing Society Formed

by Bob Bradley—TM-'54

Students in the Clemson School of Textiles have again stepped out in front of the other textile schools of the nation—this time to form the Alpha Chapter of the National Textile Manufacturing Society. The club was formed in order to bring about a more intimate relationship between the textile industry and the undergraduates of the textile manufacturing school.

Some months ago several students here approached Professor T. A. Campbell, Jr., about this club. Walton Cassidy, Max Hance and a few others were instrumental in the idea. After several more talks with Prof. Campbell, a meeting was called for all students at Clemson majoring in textile manufacturing. To the surprise of many, 88 turned out for the charter meeting.

Another meeting was held two weeks later and a few more names were added as charter members. The club now has a membership of 133. The first two or three meetings were organizational, with officers being elected and a constitution being drawn up. Walton Cassidy was elected as temporary president, but since that time, permanent officers have been chosen for the entire year.

Max Hance is now president of the group. Other officers are Dave Crawford, Vice-President; C. J. Whitehead, Jr., Secretary; Reid Horton, Treasurer; J. G. McCants, Sergeant-at-Arms; G. T. McLeod, Corresponding Secretary, and Bob Bradley, Publicity Secretary. They will hold office for the remainder of the year.

Members taken in at any future date will be voted in by the present members of the club. The charter group decided that only juniors and seniors shall be voted into the club. Membership dues are one dollar for one semester. Elected members will be assessed two and one-half dollars, with one dollar of this being sent to the National Organization.

As soon as the club at Clemson is fully organized, other schools having a textile manufacturing course in the curriculum will be contacted in the hope of forming clubs on the individual campuses. Officials at Clemson have expressed hope that within a short time the club will grow in national scope as have other honorary and professional fraternities.

Two meetings a month are now being held here. Prof. Campbell has been lining up some interesting programs, both educational and entertaining. Mr. Donald Marshall, a Clemson graduate now with the Draper Loom Corp. in Spartanburg, was on the campus at the fourth meeting of the club to show a movie on the latest Draper looms. Other such programs are now being planned.

The original group adopted white and purple as the official colors of the organization. The seal is a coat of arms containing a bale of cotton, a cone of yarn and a bolt of cloth. It is the expressed hope of the few men who first conceived the idea, the charter members and officials at Clemson, that in future years this National Textile Manufacturing Society will rank with other college fraternities over the country.

Many great things have come out of this great college. This club could easily be added to the list.

American Society Of Textile Engineering Activities

The recent meeting of the A. S. T. E. was devoted to plans for incorporating the local chapter. The Lowell Engineering Society of Lowell, Massachusetts has submitted a revised Constitution to the A. S. T. E. to meet with possible national expansion. However, the ratification of the new Constitution is pending.

Mr. Felix Montgomery of Georgia Tech visited Clemson recently to gather information concerning the establishment of a chapter of the A. S. T. E. there. The Clemson Chapter is looking with much anticipation to the outcome of the movements to Georgia Tech and of the Lowell Engineering Society.

Seven new members were initiated into the Society at the last meeting. The new members are: W. T. Holliday, Greer; C. W. Kennedy, Greenville; F. M. Welsh, Jr., Clemson; C. K. Bailey, Lockhart; L. W. Long, Conway; S. J. Courtenary, Greenville; and J. S. Carlisle, Spartanburg.

All members are urged to get in contact with any of the club officers concerning the annual club banquet to be held at the Clemson House.

——BOBBIN AND BEAKER——

He parked on a lonely country road, turned to his girl, and said: "Are you a Camel or a Chesterfield?"

Puzzled, the girl asked, "Why?"

"Do you satisfy or do you walk a mile?"

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The American System Of Worsted Spinning

(Continued from Page 5)

ed the Casablanca system on some of its frames in 1932. Karl B. Nixon, a 1928 graduate of Georgia Tech, began to experiment with making worsted yarn on one of these frames. The first step was to increase the spacing of the rolls and lengthen the aprons; this made it necessary to redesign the stands, cradles, stirrups and saddles. These changes made it possible to spin fibers up to three inches in length. In order to run even longer staple all the spacings were increased again, longer aprons were installed, all the attachments were redesigned, and larger diameter rolls were installed. Then, in order to completely control fibers of different lengths, it was found necessary to positively drive both the top and bottom rolls. With these changes it became possible to spin staple lengths up to five inches.

Most of this yarn was knitted into jersey cloth, but some of it was woven into fabric by George Carson at the National Dixie Mill, then operating in Newnan. The slump in textiles in 1937 put a stop to these experiments. In 1938, Wyllys H. Taylor joined the Newnan organization, bringing about an association with Karl Nixon, and permitting a coordinated effort by the Newnan organization to perfect worsted spinning on their especially adapted machinery. Much credit is due to the entire organization for the enthusiasm, persistance, and skill with which they carried this development through to completion.

After Newnan developed the spinning process, work was begun on the preparatory processes. This was done as rapidly as new machinery could be designed or attachments designed for the machines then in use Much of the machinery was made to Newnan's specifications by the Whitin Machine Works. Whitin, at first, considered Newnan to be mildly insane; this could best be expressed by the statement: "We don't think that it will run, but if Newnan wants it, go ahead and make it for them!". Actually, minor changes and adjustments were made to all of this machinery after Newnan received it.

When it was found that these experiments gave effective results, this company began to produce worsted yarns for the market. By 1939, Newnan was spinning worsted knitting and weaving yarns, and by 1940 it was weaving worsted goods on its own looms. Actually there was very little of this system which could be patented, so it was decided to keep this process closely screened and run it as

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long as possible without competition. This was done until it was released in 1946.

This system of worsted yarn manufacture was first called the Newnan System and later changed to its present name. The name, American System, was suggested by Francois Cleyn in an article published by Textile World in April, 1948. The name is used for the process of manufacturing worsted yarns and fabrics on long draft cotton machinery. The American System used the principles of spinning originated by Newnan. The preparatory processes, which are still being developed, are different from those used by Newnan.

The Whitin Machine Works has played a large part in the development of the American System. In fact, a fair claim would be that Newnan originated the system and Whitin developed it. Most of this development was carried on under the supervision of R. J. McConnell, Vice-President of Whitin Machine Works. Since the machinery for this new process has been placed on the market, there has been much experimentation and more development by the purchasers. No system such as this is perfect at birth, and this development should go on for years.

The American System is neither a true cotton process, nor is it similar to the French or Bradford systems; yet it produces yarns equal to the best of these two methods. One of the features of this system is its excellent adaptability to running synthetic fibers or blends of fibers. Among the fibers or blends of fibers successfully run on this system are: cotton, wool, rayon, nylon, Orlon, Fiber V, Dynel, Saran, Kemstrand, and other synthetic fibers. Another surprising feature is the brilliance and depth of color after it is dyed. This is evidently due to the spinning process, because the weaving and finishing processes are standard.

Whitin Machine Works reports that, in addition to the machinery running in this country, a substantial number of spindles have been exported to Europe. France, Norway, Sweden, and Holland all all have installations of the American System.

It is the opinion of many prominent textile executives that in the future the woolen and worsted industry will change to a low-cost, high-production yarn manufacturing system. This change will most probably be in the direction in which the American System has pioneered. The textile industry has developed tremendously during the last decade, and now there are unlimited horizons for technical men who have chosen this as their life's work.

——BOBBIN AND BEAKER——

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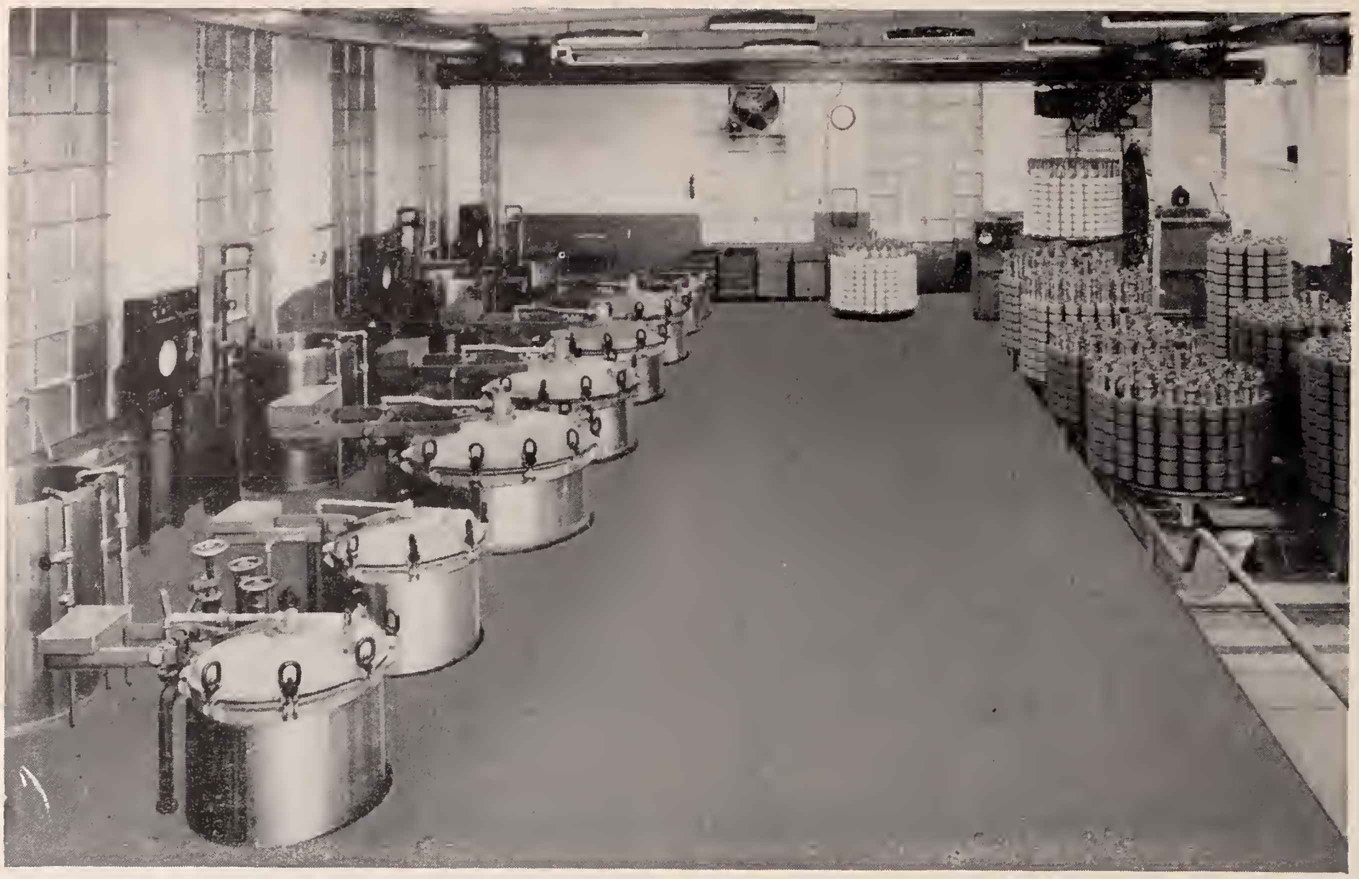

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Where Are They Now . . . ?

(Continued from Page 15)

Apprentice at Burlington, North Carolina; Lloyd Purser, Weave Room Apprentice at Newton, North Carolina; R. J. Reynolds, Assistant Superintendent at Burlington, North Carolina; Arnold Sanders, Superintendent at High Point, North Carolina; Clarence Smith, Assistant Superintendent at Phenix Plant, Kings Mountain, North Carolina; G. A. Smith, Department Head at Greensboro, North Carolina; S. M. Thomson, Superintendent at Dublin, Virginia; William Triplett, Superintendent of Preparatory at Burlington, North Carolina; Bill Whisnant, Superintendent of Sample Department at Burlington, North Carolina; Tom Bobo, Weave Room Apprentice at Bristol, Virginia; James Brumley, Supervisor at Greensboro, North Carolina; J. Childers, Weave Room Apprentice, Mooresville, North Carolina; Lewis Deanhardt, Weave Room Apprentice at Lexington, North Carolina; B. D. Hicks, General Apprentice at Gastonia, North Carolina; Jack Ingle, General Apprentice at Greensboro, North Carolina; Dan McCoy, Supervisor in Throwing at Vinton, Virginia; Tom Mack, Supervisor in Weaving at Ossipee Plant at Elon College, North Carolina; William Mathias, Apprentice at Greensboro, North Carolina; James Neal, Laboratory Asistant at Greensboro, North Carolina; Charles Pace, Supervisor in Throwing at Burlington, North Carolina; Thomas Perry, Apprentice at Burlington, North Carolina; Clint Riser, Apprentice at Greensboro, North Carolina; Frank Taylor, Apprentice at Greensboro, North Carolina.

Future graduates? Their hopes and ambitions are yet to be fulfilled, but in the years to come many of them will also be on the long roster of the Clemson men in the textile industry.

——BOBBIN AND BEAKER——

A girl just arrived here from the East, and took a position with a feed store. She was warned that Kansas farmers were great joshers, so she made up her mind not to be "taken in" by them. The first morning a farmer came in and asked for some shorts (ground corn) for his pigs, and the girl replied, "I'm sorry, but we're out of pig shorts, but how about some nice brassieres for your cows?"

——BOBBIN AND BEAKER——

Wife: "You know, I suspect that my husband has a love affair with his stenographer."

"Maid: "I don't believe it. You're just trying to make me jealous."

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The BOBBIN & BEAKER, official student publication of the Clemson Textile School, announces the appointment of the new staff for the coming year. George A. Mobley is taking the post of Editor, with Alvin H. Clarke as Managing Editor. Gilbert W. Ballentine will serve as Assistant Managing Editor, and William H. Walker will act as Business Manager. Other officers are R. John Kay, Advertising Manager; R. L. King, Ass't Advertising Manager; Paul Hazle, Circulation Manager, with Thomas L. Yelton acting as his assistant. Jack Trimmier is the staff photographer.

Student (to clerk in bookstore), "How much is this paper?"

Clerk: "Seventy-five cents a ream."

Student: "It sure is."

——BOBBIN AND BEAKER——

What's the matter with your finger, Harry?

Oh, I was downtown getting some cigarettes yesterday and a clumsy fool stepped on my hand.

——BOBBIN AND BEAKER——

Prof. Guion: "Is the theory clear to you now?"

Alvin Clarke: "Just as clear as if it had been translated into Chinese by Gertrude Stein and read to us by a tobacco auctioneer."

New York's Museum of Natural History has boasted of the countless art-lovers who came to see wonders. But when a comfort station was erected on a near-by corner, museum attendance fell off 100,000.

——BOBBIN AND BEAKER——

The professor of chemistry was giving a lesson on the explosive qualities of different chemical combinations.

"This," he explained, "is one of the most dangerous explosives known. If I am in the slightest degree wrong in my experiment we are likely to be blown through the roof. Kindly come a little closer, so that you may follow me better."

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Good Housekeeping Habits Pay Off In Textile Mills

(Continued from Page 7)

type of filling numbered, the complexity of the storage problem would be minimized. There are several systems that are employed in getting the right filling to the right loom. One of the more simple methods is to have a card on each loom with the filling number and loom number on it. When the filling supply at the loom runs out, the worker can take the card off the loom and place it on the truck. When he has enough cards for a load he can refill his truck from the filling storage room and distribute the filling with a minimum of confusion.

This represents some of the many housekeeping problems that arise in the modern textile plant of today. Many of these problems can be solved by using just plain common sense while others require a little more thought. By having a good system for the movement and storage of the cotton as it passes through the mill a considerable amount of money and labor can be saved. Regular maintenance and oiling schedules should be observed and the mill executives should also think of the health conditions that prevail in the plant.

As The Editor Sees It

Should Professors Be Graded...?

"Knowledge is apt to be ponderous, boring and a bit stuffy. If, therefore, instructors make their lectures so interesting they cause pupils to sit forward on the chair edges, there is no need for later 'cramming'." This quotation from Earl Stanley Gardner, noted writer of detective fiction, is a goal for which all professors should strive. If a professor knows in what way he falls short of this goal, he will endeavor to improve his lectures and methods. Consequently, the following questions and answers have been compiled concerning a system which would aid instructors in reaching their goal.

Why should we grade professors? Is it to retaliate for the low grades and long assignments that some of them give us? I do not believe that this should be the sole aim of a grading system for the preferences, but I do think that such a system would be beneficial to the instructors as well as the students.

Has such a system ever been tried? Yes. It is now in operation at N. C. State and Wake Forest, and even in the Engineering Department at Clemson. The University of Iowa also has such a system.

How does it work? Who conducts the tests? Who gives the Grades? Here is the way it works in the Engineering Department at Clemson. The members of Tau Beta Pi, the Engineering Honorary Fraternity, compiled a list of twelve qualifications. Each student in a class was given a copy, and the student was supposed to grade the professor teaching that class on each qualification, ranging from 5 for superior to 1 or 0 for definitely inferior. The student was supposed to be as fair and unbiased as he could, and grade the instructor in accordance with his honest opinion. The sheets were then collected, and the average grade compiled from the sheets. The profssors were then rated according to their percent on the test and their relative standing in the faculty.

What are the advantages of such a system? Such a program would give a good basis for the instructor to determine how he stands with the students, and let him see the reason why students do not sign up his courses except as a last resort. It shows a professor how he could improve his technique, and make his courses more interesting to the students. In some schools, it is mandatory that a professor maintain a fair grade on these yearly grading tests to remain on the faculty. I believe that such a system would be helpful to the Textile School, in that it would let the professors know how they stand with the textile student body as a whole. It would make an instructor more conscientious in his teaching and in the presentation of the subject.

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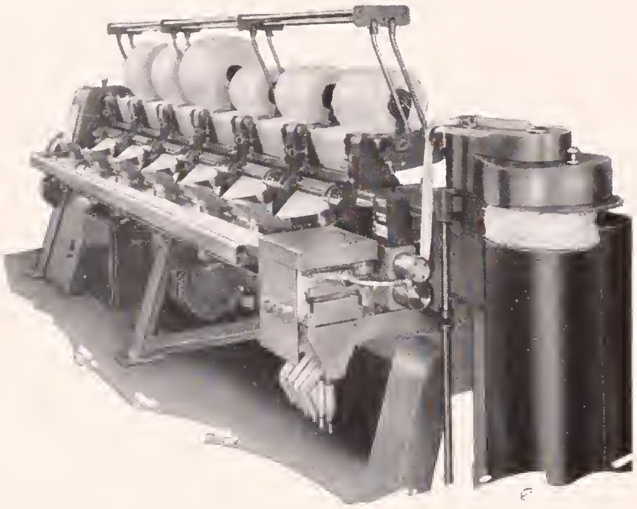

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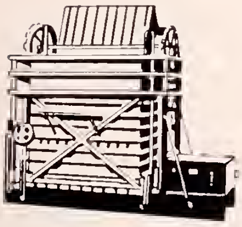

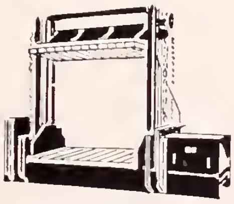

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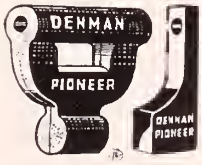

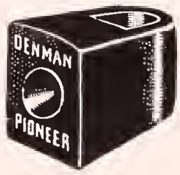

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STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

No. 1 WINTER ISSUE ☆ 1951-1952 Vol. 10

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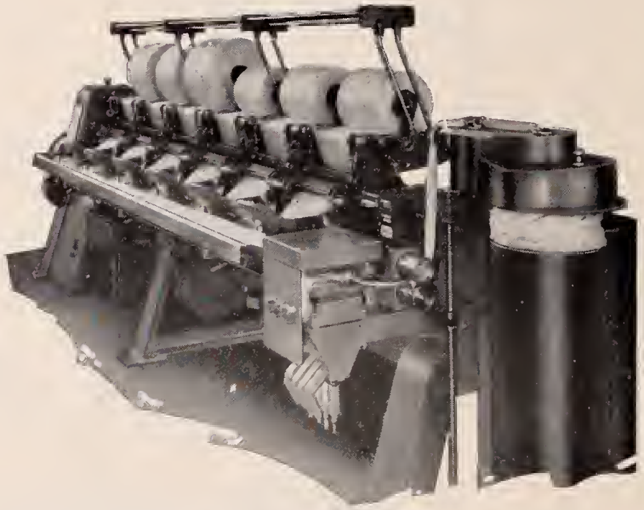

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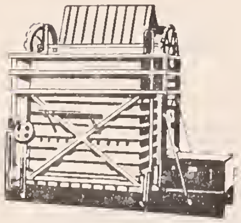

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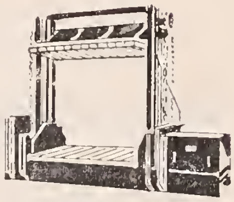

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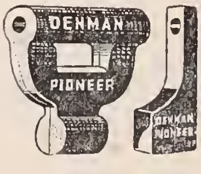

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Bobbin and Beaker

Official Student Publication
Clemson Textile School

VOL. 10 WINTER 1951-1952 NO. 1

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THE COVER

The cover depicts the unveiling of the portrait of the late Joseph E. Sirrine at the dedication services held November 3, 1951 in the College Chapel.

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"D" - For Dedication Day

R. L. King, TM '52

An occasion that we have all awaited for years has finally taken place here at Clemson—the dedication of the textile building. The building, which covers two and a half acres of ground space, was completed in 1939, and named Sirrine Hall. The machinery necessary to completely equip the building was the reason for the delay of its dedication, since it could not be obtained during the war. Recently all the equipment has been obtained from various firms throughout the textile industry.

Here, on Saturday, November 3, 1951 the textile building was dedicated to the memory of the late J. E. Sirrine, who died August 7, 1947. Mr. Sirrine was chairman of the J. E. Sirrine Textile Foundation which was organized in 1943 through his efforts. This organization has been one of the chief factors in building the Clemson School of Textiles up to its unsurpassed position in the field of textile education today. Among other things, the foundation has set up a retirement plan for full and associate professors.

It is interesting to note that in the past ten years the enrollment in textile courses has increased 200 per cent. This increase tops all other phases of education here on the campus. The enrollment for the entire school of textiles is 677 students, one fourth of the college's total enrollment. The faculty has almost tripled since 1941. Today it has 30 members, ranging in rank from full professors to instructional assistants. The Dean of the textile school is Dr. Hugh H. Brown, well known research scientist.

The dedication services on November third commenced at the college chapel with the Honorable Robert M. Cooper, chairman of the Board of Trustees, giving the address of welcome. Dr. Hugh M. Brown addressed the audience on the Development of Textile Education at Clemson. The service was highlighted by the address of the Honorable James F. Byrnes, on "The Role of Industry in South Carolina's Progress." Twenty-eight of the nations leaders in industry, engineering, agriculture, and government, who have made important contributions to the progress of South Carolina through their business or outside interest, were awarded honorary degrees by Dr. R. F. Poole, President of the College.

Governor and Mrs. Byrnes enjoy luncheon at Clemson Field House

Receiving the Doctor of Textile Industries degrees were: William Hamlin Beattie, president of Woodside Mills, Greenville, S. C.; Harold Blancke, president of the Celanese Corporation of America, New York, N. Y.; Henry Mather Bliss, president and treasurer of Pacific Mills, Boston Mass.; James F. Byrnes, Governor of South Carolina, Columbia, S. C.; Robert H. Chapman, Chairman of the board of trustees of the J. E. Sirrine Foundation, and vice-president and assistant treasurer of Inman Mills and Riverdale Mills, Inman, S. C., and Piedmont Wood Preserving Company, Augusta, Ga.; Charles Ezra Daniel, president and treasurer of the Daniel Construction Co., Greenville, S. C.; Benjamin Brown Gossett, former president and board chairman of several leading textile concerns, Charlotte, N. C.

Also Francis Ebenezer Grier, president and treasurer of Abney Mills, Greenwood, S. C.; Robert E.

Henry, former president of Dunean and Victor-Monaghan Mills, Greenville, S. C.; Henry Plimpton Kendall, Chairman of the board of the Kendall Co., Boston Mass.; Leon Lowenstein, chairman of the board of M. Lowenstein & Sons Inc., New York, N. Y.; Ellison S McKissick, president and treasurer of Alice Mills, Easley, S. C.; Ralph Tannahill Marshall, president of Utica Mohawk Mills, Inc., and Utica Willowvale Bleaching Co., Utica N. Y.; Roger Milliken, president of Deering-Milliken & Co., New York, N. Y., and chairman of the board of the Institute of Textile Technology, Charlottesville, Va.

Also Walter Scott Montgomery, president and treasurer of Spartan Mills, Spartanburg, S. C.; James Cuthbert Self, president of Greenwood Mills, Greenwood, S. C.; Robert T. Stevens, chairman of the board of J. P. Stevens & Co. Inc., New York, N. Y.; Samuel Hubert Swint, president of the Graniteville Co., Graniteville, S. C.; Frederick William Symmes, president of the Nuckasee Manufacturing Co., and president of the Piedmont Plush Co., and vice president of the Camperdown Co., Greenville, S. C.; and George Mann Wright, president of the J. E. Sirrine Textile Foundation, Abbeville, S. C.

The Doctor of Industries degrees were awarded to Wofford Benjamin Camp, president of the Calolina Farms, president of W. B. Camp & Sons, Inc.; Francis Breese Davis, Jr., director and former chairman of the board of United States Rubber Co., chairman of the board of National Distillers Corp.; Jeremiah Milbank, director of the Chase National Bank, Metropolitan Life Insurance Co., Southern Railway, the American Surety Company; Norman Atwater Cocke, vice-president of the Duke Power Co., and Northern Railway Co., Charlotte, N. C.; Frank McClellan Gunby, a 1902 Clemson graduate, and associate and director of Charles T. Main, Inc., Boston, Mass.; Melton Clarkson Lightner, president of the Singer Manufacturing Co., New York, N. Y.; and Homer MacGee Pace, a vice-president and director of the South Carolina Electric & Gas Co., Charleston, S. C.

James C. Self, Ralph T. Marshall, Charles E. Daniel and Robert T. Stevens inspect the Clemson Textile Building

After the degrees were awarded, the Honorable T. Frank Watkins unveiled the portrait of the late Joseph Emory Sirrine, and gave a brief history of his achievements during his lifetime. Following the services in the college chapel, the honorary guests and their parties were taken on a guided tour through the textile building; also many other visitors were guided through the textile building. During the tour all of the machinery in the building was being operated by textile students.

The writer of this article can truly say that he felt exceptionally proud of being a textile student on that day. The building was in the best condition that I have seen it in during the time that I have been here. We can thank only those men, companies, industries, and the Sirrine Foundation for helping us to build one of the greatest textile schools in the world, and for making the dedication of the textile building such a wonderful occasion and success.

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John T. Wigington Appointed Executive Secretary of Phi Psi

Earl Heard, Grand Council President of Phi Psi, announces the appointment of John T. Wigington, Textile Engineering graduate from the School of Textiles, The Clemson Agricultural College, Clemson, S. C., as Executive Secretary. Wigington finished in the class of 1923 and was elected to honorary membership in the Fraternity in 1940. He is presently located at Clemson as Director of The Division of Technical Service of The American Cotton Manufacturers Institute, Inc.

Upon his graduation from Clemson, Wigington was employed by the Ware Shoals Manufacturing Company, Ware Shoals, S. C. In 1924 he accepted a position with The Lonsdale Company, Seneca, S. C., as Night Superintendent. Three years later he returned to Clemson as a Cotton Technologist with the Cotton Spinning Research Laboratory of The United State Department of Agriculture. In 1928 he became Research Engineer with The Textile Bag Manufacturers Association in Chicago. One year later he moved to Washington, D. C., where he was appointed Cotton Technologist with The Department of Agriculture. In 1943 he served a short while as Superintendent of Edna Mills, Reidsville, N. C.

Returning to Clemson with The Department of Agriculture in the Fall of 1934, Wigington spent six years in cotton fiber and spinning research work. In 1940 he was transferred to College Station, and placed in charge of The Cotton Fiber and Spinning Research Laboratories of The United States Department of Agriculture.

Since 1941 he has been associated with The Cotton Textile Institute, Inc., and The American Cotton Manufacturers Institute, Inc., with headquarters in the School of Textiles, Clemson College, Clemson, S. C.

John Wigington is a member of the Arkwrights, Inc., the American Society for Testing Materials, the American Association of Textile Chemists and Colorists, and is Secretary of The Fiber Society. He is a Methodist, a Mason, a Rotarian, is a Director of the Clemson Alumni Corporation, and is listed in the sixth and seventh international editions of **Who's Who in Commerce and Industry.** He married Frances Wray and they have a son, John T. Jr., who graduated in Textile Engineering at Clemson in 1948 and is now with Chicopee Manufacturing Corporation, Gainesville, Ga. There is a John T. III.

Mr. Wigington

Wigington is the author of quite a number of technical papers dealing with Cotton Fiber and Spinning Research Work and has been a frequent contributor of articles to professional journals and textile trade papers.

Teacher: "Now, children, every morning you ought to take a cold bath; and that will make you feel rosy all over. Are there any questions?"

Boy in back of room: "Yeah, teacher. Tell us some more about Rosie."

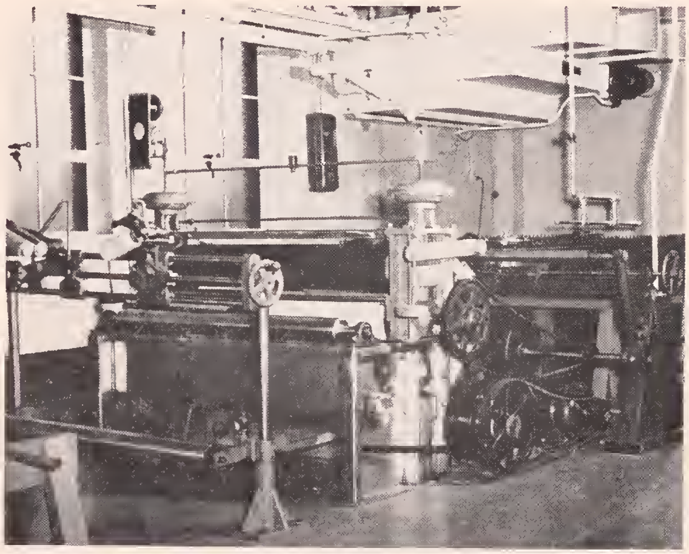
Clemson Finishing Department Advances

R. R. Fowler '53

On November 3, 1951, the J. E. Sirrine Textile Building at Clemson was officially dedicated to the late J. E. Sirrine of Greenville, S. C. This proved a memorable occasion in that a number of leading executives of the textile industry were awarded honorary degrees for outstanding accomplishments in the textile field. These honor guests, along with approximately 600 other visitors, were conducted on a tour of the entire textile building by volunteers of the faculty and the student body who acted as guides. These guests saw the whole of the Clemson School of Textiles at its maximum efficiency, boasting more and better machinery and equipment than ever before.

The department which has the greatest variety of new units is the dyeing and finishing laboratory. There has recently been a great expansion in the textile processing machinery at Clemson which is to be used for educational, experimental, and research purposes. The new machinery is a great improvement over the old equipment in that the new machines and equipment are planned to permit work on the majority of textile fibers which include cotton, wool, rayon, and many other synthetic fibers, whereas the old machinery was limited almost entirely to the handling of cotton.

In the dyeing phase, there is a continuous dyeing range, through which an entire roll of cloth is processed in a single operation. The cloth is mechanically unrolled and fed into the back of the machine and taken up at the front where it is put into roll form, completely processed. A continuous peroxide range is used for bleaching. However, to aid in this bleaching, the laboratory is equipped with a sample kier, in which the cloth may be boiled under pressure before it is bleached. This boiling process dissolves many impurities and suspended matter and thereby aids greatly in more successful bleaching. The laboratory is also equipped with a sample mercerizing unit, 2 reel dyeing machines, and a resin curing oven which is gas fired and attains temperatures of 300-400 degrees F. This resin curing oven sets special finishes for crush resistance, water repellancy, and other similar properties. A 60 inch jig is available for dyeing knitted and woven piece goods. Also available in the laboratory are a Mantle-steaming machine, a fulling machine, a scutcher, a singeing machine, a set of dyeing cans, 2 types of printing processes, and a tenter frame, with housing for drying.



Tenter Frame used for mercerizing cloth in Finishing Laboratory

This laboratory provides equipment used expressly by the Throwing and Knitting Departments as well as that used in dyeing and finishing processes. Equipment used extensively by the Throwing Department at Clemson are a soaking tub, a twist setting machine, and a cake and package dryer.

As knitting is becoming a very attractive major for Clemson students, new equipment has been installed to further advance the training offered in this field. Recently, two machines were acquired for winding silk from cocoons and rewinding this stock into commercial skeins. These machines are, respectively, a reeling machine and a re-reeling machine, and both machines were imported from Japan. The Knitting Department has also acquired a hosiery dyeing, a nylon pre-boarding machine, and a number of hosiery drying forms.

In a separate room, adjacent to the dyeing and finishing laboratory, are three very important testing machines: a fadeometer, a weatherometer, and a

(continued on page sixteen)

The Value of a Standards Department

Joel L. Richardson

The question is sometimes asked, "What will happen to the standards departments in textile mills if a depression should come?" In hard times the mills must cut costs to the absolute minimum and in looking for ways and means to accomplish this purpose some feel that the standards departments would be dissolved and its work be disposed of by the respective department foremen and various other local plant executives. This is rather hard to believe in view of the many problems that have been solved by maintaining a local standards department. Before the mills organized their own standards department, the sales department depended on cost estimates, based on past performance records. Many mills found after establishing their standards departments and running time studies with a stop watch, that the standards set up based on past performance were very inaccurate.

Some may say, "But our cost estimates were based on standards set up by Textile Consultants and we have these consultants revise our standards once a year, therefore, we believe our cost estimates and job assignments are accurate." This is true in a number of instances. Some consultants have done a very good job and we salute them for a job well done. However, these consultants are at the plant only once a year and cannot possibly have the information and first hand knowledge of individual plant operation that a local time study man would have. Then too, a local time study man works constantly with the employees; he gains their respect and trust. This, we have learned is important, as the time study man must have the cooperation of the operator being time-studied to get accurate results. If an operator decided not to cooperate with the time study man, there are many, many ways that an operator could cause the time study man headaches, which could be avoided if he had the cooperation of the operator. For instance, speed rating of the operator is complicated by an operator who works spasmodically during the timing of an element.

Mr. Richardson finished Clemson in the Class of 1942, and accepted a position with United Merchants and Manufacturers, where he worked as office manager and cost accountant. He was also associated with the time study department and with the open stock and shipping departments. He returned to Clemson in Februray of 1949, where he became assistant professor of Textiles. He now teaches all time study courses at Clemson.

When new patterns come to a mill, the standards department immediately starts to develop standards, based on time study, and accurate cost estimates are submitted to the sales department. The mill knows the minimum price they can quote to a customer. Contracts have been lost by mills due to high cost estimates caused from standards based on a lot of guess work. In other instances some contracts have been obtained at a sale price of less than manufacturing costs, causing the mills to actually sell their product for less than cost of manufacture. During World War II, the government refused to grant a contract to the lowest bidder in one instance because it was known that the bid was lower than cost of manufacture. Such guess work as this has been the downfall of many concerns.

Standards departments accumulate standards data over a period of years which is extremely valuable and enables the standards man to get standards developed much faster and more accurately. Tables and constants are worked up that save considerable time. Many mills use their time study men to run down the cause of bad running work by making detailed machine stop checks. These checks serve to point out exactly what is causing the larger percentage of stops.

The standards department also serves as a stepping stone in the training of future foremen. The standards department is ideal for this in that standards work will give this person an overall picture of the entire plant operation. He comes in contact with all of the foremen in the various departments and learns to appreciate the problems that these men have in

(continued on page seventeen)

Higher Education in Textiles

G. A. Mobley, TE '52

Outside of the textile industry, one seldom hears of the Institute of Textile Technology, or I. T. T., as it is more commonly known. This school, located a few miles from Charlottesville, Virginia, is to the field of textile research what The Massachusetts Institute of Technology is to Electrical and Mechanical Research. In other words, it is just about as high as one can go.

I. T. T. serves a twofold purpose for industry. First, it is a clearing house for problems of all kinds which occur in the production of textile goods. Second, it serves as a training center for men interested in textile research.

The Institute is not an orthodox college, but is a cooperative project jointly owned by a group of Textile mills. These mills contribute to the funds necessary for the operation of the Institute, and have the controlling voice in its management. Any of the member mills is eligible to send any project or problem they have to the Institute to try to get a solution. Many times the research staff at I. T. T. is able to find the causes of troubles which have been harassing mills for years and were accepted as inevitable before.

The second purpose of the Institute, that of training men in research, is by no means the least important of its functions. Outstanding graduates of the major textile schools throughout the nation are considered for enrollment; however, as educational institutions go, the student body is extremely small. Ten students a year are usually chosen, and enrolled in the first year's work. Courses in Mathematics, Mechanics, Mechanical Engineering, English and Fiber Technology are given in the first year's work, with the second year devoted to Fiber Technology and Research. The successful completion of the course at the Institute results in a Master's Degree in Textile Technology, and unlimited possibilities in the textile field.

As above mentioned, the Institute is near Charlottesville, Virginia, which is also the seat of the University of Virginia. The buildings consist of the main administration and office building, a four story laboratory building, and a number of smaller auxiliary buildings housing the power plant, a testing laboratory, and a machinery laboratory where large projects are conducted. The view to the north and west of the Institute is exquisite, and has been referred to as "the Thousand-Dollar View." The Blue Ridge Mountains are only about twenty miles away, and they lend a beauty to the campus not often found.

Since the University of Virginia is very close, the Institute can draw upon its staff of outstanding educators for the courses in English, Mathematics and Engineering. Most of the subjects relating to research, however, are taught by the staff of the Institute. Among these instructors are such outstanding personalities as Mr. T. L. W. Bailey, noted expert in microscopic research, Dr. L. H. Hance, Director of the Graduate School program, Dr. Jack Compton, Director of Technical Research, and Dr. E. J. Bernet, who is a pioneer in the study of textile uniformity.

This institution, the only one of its kind in the United States, has been found to be very beneficial to the textile industry as a whole, and to the member mills in particular. It has provided the means of saving untold sums of money, as well as increasing quality of products. It has also provided men well trained in research, who are capable of assuming the responsibility of directing the research carried on in the individual mills, and who can cope with the constantly arising problems of industry which a less highly trained man would find insurmountable.

H. H. WILLIS
TEXTILE CONSULTANT
Clemson, South Carolina

LINTHOUSE PERSONALITIES

G. W. Ballentine, TM '52

PROFESSOR T. A. CAMPBELL

"Next page, boys!"

Most of you who are majoring in Textile Manufacturing or Textile Engineering are acquainted with Professor Campbell, and I feel sure that those of you who are not will be before you finish Clemson. Professor Campbell teaches Textile Costing, a five credit course which has proved to be extremely valuable in rounding out our education in textiles here at Clemson.

Mr. Campbell was born in Anderson, South Carolina, and is married. He has a daughter attending Winthrop and a son in Clemson-Calhoun High School. After finishing high school, Mr. Campbell decided to continue his education at Clemson, and in 1928 he received his B.S. Degree in Textile Industrial Education. After finishing Clemson, he taught high school at Chester, S. C. Upon his departure from Chester, he went to Rock Hill where he was employed by the Aragon & Baldwin Mills, which is now a part of the J. P. Stevens & Co., chain. From 1932 to 1937 he worked for Ralph E. Loper & Co., Textile Costing Engineers.

In the fall of 1937, Professor Campbell returned to Clemson. The Textile School during those years was in sad need of a textile costing course, so Mr. Campbell organized the course at Clemson which has proved to be a valuable asset in the TE and TM curricula. Many of our graduates now enter textile costing work, thanks to Mr. Campbell.

After staying at Clemson for several years, he decided to take time out from his teaching duties so that he might continue his education. In 1947, he received his Master's Degree in Industrial Education from Pennsylvania State College after which he returned to Clemson.

Professor Campbell is well liked by the students and is frequently referred to, in student circles, as "Speedball." I do not know, but I have been told that if you drop your pencil in class, you are two weeks behind in your work.

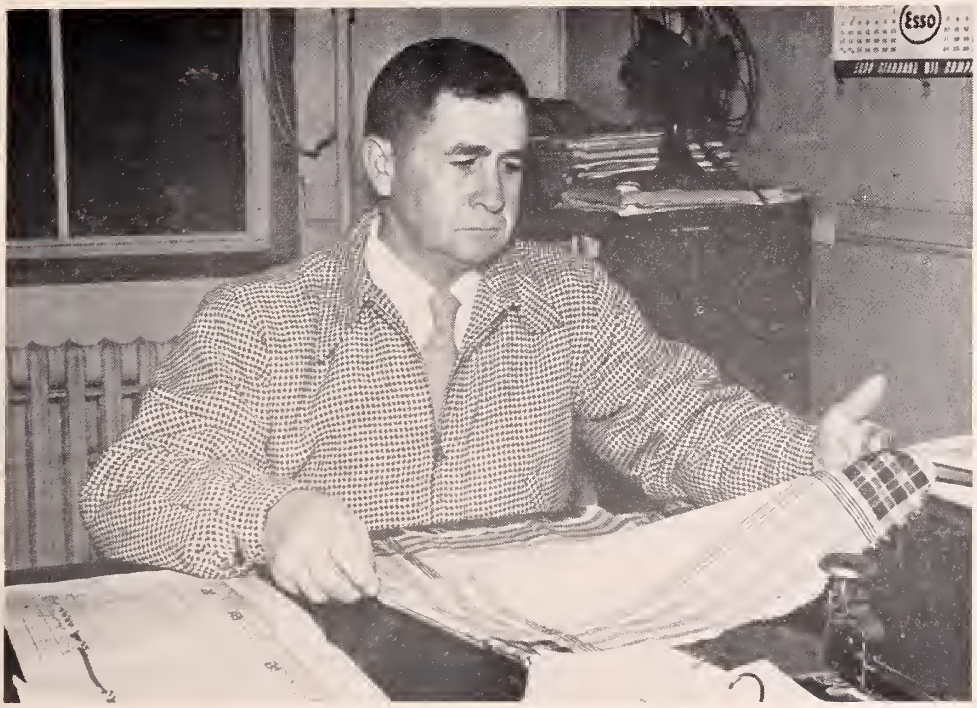
In addition to teaching, Professor Campbell has done consultant work for several mills throughout the country at various times. He is active in several clubs and fraternities, including Phi Psi, Iota Sigma, and the Lions Club. He is also an active member and faculty adviser of the recently formed National Textile Manufacturing Society which he helped to organize.

The elderly textile school professor entered the barber shop all bent over and apparently in great pain, "Damn that Hadacol!" he muttered as he climbed into the chair.

"If it affects you that way, what d'ya take it for?" asked the barber.

"Doggone it, I'm not taking it.—My wife is!" grunted the Professor.

PROFESSOR E. F. CARTEE



"Cloth Analysis, Not Cloth Guessing!"

Professor Cartee is connected with the Weaving and Designing department of the Clemson Textile School. He teaches Fabric Analysis, which is a study of the analysis of fabrics as they come to the mill for duplication. He also teaches Dobby and Box Mechanisms, a course designed to fit into the series of Mechanism courses at Clemson. Both of these courses are taken by the students majoring in TM, and the Mechanism course is part of the TE Curriculum.

Mr. Cartee was born in Liberty, South Carolina and is married. After finishing high school, Clemson became the college of his choice, and in 1925 he received a B.S. Degree in Textile Industrial Education. Between his freshman and sophomore years at Clemson, he obtained valuable experience with the Hopedale Loom Co., in Massachusetts, which has subsequently been bought out by the Draper Corporation.

After finishing Clemson, he taught school at Clover. S. C. In 1927, he began teaching at Clemson. Professor Cartee has been a beehive of activity and in addition to teaching at Clemson, he has taught night school at several places. During summer vacation periods, he worked for various mills among which were Judson Mills, Dunean Mills, and Woodside Mills, all of which are located in Greenville, South Carolina. He has also worked for the Gossett Mills in Anderson and the Hanover and High Shoals Mills, both of which are in Gastonia, North Carolina. In 1937, Mr. Cartee received his Master's Degree in Industrial Education at the University of Tennessee and in 1940 began work on his Doctor's Degree.

Professor Cartee has been known to throw in a little philosophy on the side. One day one of the students made a design in which the plain weave was the weave on one harness. Professor Cartee corrected him by saying, "Son! You can't get a quart of water in a pint jar!"

Professor Cartee is well liked by the students who call him "Uncle Bud." If there is anything that you do not know about how a piece of cloth has been woven, this writer is willing to wager that he can tell you.

We've heard that the way you can tell a rich Texan from a poor Texan is that the poor Texans wash their own Cadillacs.

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WARP ENDS

Mrs. Cothran: "That new washwoman has stolen two of our towels."

Ed: "The thief! Which ones, dear?"

Mrs. C.: "The ones you got from that hotel in Sarasota."

Tommy: "Mama, it is true that we come from dust and will return to dust?"

Mama: Yes, dear, that's what the Bible says. Why?"

Tommy: "Well, I just looked under my bed and there's somebody there, either coming or going."

Teacher: "Now, Kitty, tell the class the difference between a lion and a panther."

Kitty: "Thath eathy, Mith Brown. A lion roarth; and panther what I got on.

Who cares how empty her head is, as long as her sweater is full.

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Instructors Added to Textile School Staff

S. W. BODDIE

H. L. LOVELESS
Assistant Professor of Yarn Manufacturing

A native of the Lone Star State, Mr. Loveless graduated from Friona High School in 1943. He entered Texas Tech. in 1944 and received a Textile Engineering Degree from this institution in 1948. Continuing his education, Mr. Loveless then attended North Carolina State for two years and obtained an M.S. Degree in Textile Manufacturing. After receiving his Master's Degree, he was employed by Anderson, Clayton, and Company where he worked for one year in setting up a spinning laboratory for this firm. During his course of education, Mr. Loveless became a member of Phi Psi, Tau Beta Pi, and The Texas Society of Professional Engineers.

H. L. LOVELESS

S. W. BODDIE
Instructor in Textile Chemistry

Mr. Boddie hails from the lower part of the state where he graduated from Charleston High School in 1940. He entered the College of Charleston the same year and received a B.S. Degree in Chemistry in 1944. After serving two years in the Army Air Force, Mr. Boddie worked two years in the Naval Metallurgical Laboratory. He was a student at the University of North Carolina for one year and then entered Clemson in the fall of 1950. While working toward his M.S. Degree in Textile Chemistry, Mr. Boddie is acting in the capacity of graduate assistant in this department.

DAVID H. WITT
Instructor in Textile Testing

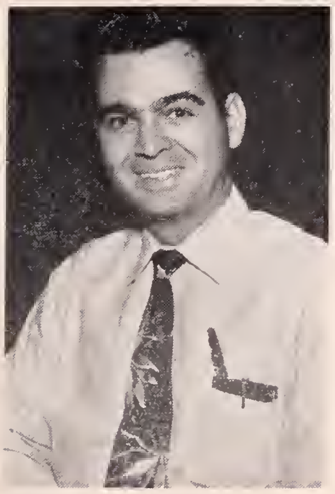
Mr. Witt is one of two new professors who are recent graduates of the Clemson class of 1951. Following graduation from Swansea High in Swansea, S. C., Mr. Witt entered Clemson in September 1947. In addition to a B.S. Degree in Textile Engineering, he received a reserve officers commission in the Army Ordnance Corps. Since his graduation he has been engaged as an instructor in the Testing Lab. While at Clemson, Mr. Witt was a member of Tiger Brotherhood, Mu Beta Psi, A.S.T.E., a member of the Band, and also president of the Wesley Foundation—the latter during his senior year.

JAMES M. NIVER

JAMES M. NIVER
Instructor in Weaving and Designing

Mr. Niver is another graduate of the Clemson Class of '51 who is pursuing the teaching profession. After finishing Bluffton (S. C.) High School in 1945, Mr. Niver served sixteen months with the Merchant Marine. Completing this tour of duty, he then joined the Army and served eighteen months in the Field Artillery. Mr. Niver was discharged in 1948 with the rank of Corporal and entered Clemson in September of the same year. He added advanced R.O.T.C. to his curriculum and graduated in August of 1951 with a B.S. Degree in Textile Manufacturing plus a reserve commission in the Armored Division. Mr. Niver is a member of Phi Psi.

DAVID H. WITT



JOHN L. THOMPSON

JOHN LESTER THOMPSON

Assistant Professor of Yarn Manufasturing

Mr. Thompson is another professor who has returned to the Alma Mater after a few years absence. Graduating from North Augusta High School in 1938, he entered Clemson and in 1942 received a B.S. Degree in Textile Engineering plus a reserve officer's commission in the Quartermaster Corps. He put this commission to use by serving four years in the above mentioned branch of the army. Thirty-three months of this time was spent in the African and European campaigns. At the time of his discharge he held the rank of First Lieutenant. After being discharged, Mr. Thompson was employed by Seminole Mills of Clearwater, S. C.—a branch of United Merchants and Manufacturers, Inc.—from 1946 to 1951. When he left this organization, he was overseer of the cloth room.

While a senior at Clemson, Mr. Thompson was Regimental Commander, Captain of Scabbard and Blade. and was listed among Who's Who in American Universities and Colleges.

Mr. Thompson is married and the father of three young boys.

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FINISHING DEPARTMENT

(continued from page seven)

launderometer. The fadeometer is used for testing dyed fabrics for color fastness under varied conditions. The weatherometer determines how a certain dye will hold up under various weather conditions, and the launderometer provides an accelerated method for testing the fastness of a dye to washing.

In addition to the above equipment, several units, such as the jig and padder are duplicated in small scale in order that they may be used expressly for teaching problems.

In the near future, a new course called Textile Finishing will be added to the Textile Chemistry curriculum at Clemson, which will cover in detail the mechanical and chemical processes involved in the use of the above named machinery and equipment. In addition, work done in this course will be used to supplement work in other textile major courses such as Textile Manufacturing and Textile Engineering.

Professor Joseph Lindsay, Jr., head of the Chemistry Department at Clemson, expressed the desire that this above named equipment be utilized for experiment and research by the textile plants in this area.

This great step forward by Clemson was made possible entirely through generous contributions by numerous leaders in the textile field. The interest and loyalty shown by these leaders will continue to make the textile industry one of the leading industries of our state and to make Clemson one of the foremost textile schools of the world.

Drunk: "Ho! Lady, you got two ver' beau'ful legs."
Girl: (outraged) "How would **you** know?"
Drunk: (brightly) "I counted 'em."

SOUTHERN FRANKLIN PROCESS CO.
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STANDARDS DEPARTMENT

(continued from page eight)

running their department efficiently and at the same time not at the expense of a succeeding department. The time study man will run time studies in all departments coming in contact with many different people, this will broaden his ability to get along with employees and at the same time get the necessary work done. The ability to lead people is a valuable asset for a foreman, and since the time study man has no authority over the employees, he depends entirely on his leadership and ability to get the cooperation of the worker so that his work can be done with the least possible amount of labor disturbance. Another reason why the standards department is a good stepping stone for foremen is that the work he does in standards will make him methods and motions conscious. This will enable him in the future to lay out work for his employees in a more efficient manner, and train employees in better work methods.

Textile manufacturing today is done in a much more scientific way than ever before. Competition is keen at the present time and every effort is made to prevent an increase in selling price even though labor costs rise. The mills are becoming interested in Statistical Quality Control. They are interested in all kinds of testing equipment such as the Brush Uniformity Analyzer, the Uster Evenness Tester and many others. This has been brought about by a desire for better quality of product and at a lower labor cost.

The standards department relieves the foremen of many duties that otherwise he would have to perform. This gives the foremen more time to spend on the more important duties of his job. Today a larger than ever proportion of a mill supervisor's time must be spent in maintaining satisfactory personnel relations. Surveys that have been made indicate if the mill has as many as 200 employees it is sure to have enough necessary work to keep one time study man busy.

Job assignments, piece rates and standard production goals are all set up by the standards department based on time studies. These are set up accurately thereby keeping to a minimum dissatisfaction among operators about their rate of pay per unit of production or number of machines per operator.

Another duty of the standards department is to make method and motion analysis to determine and train operators in better work methods. A useful tool in this field is Methods Time Measurement. Although Methods Time Measurement is a relatively new thing, many mills have shown considerable interest and probably will use it as another tool available to the time study man for developing standards and better work methods. Methods Time Measurement is a means of establishing standards through analyzing the motion employed in performing a job.

Other duties performed by the standards department are: make payroll and cost analysis, determine standard machine efficiency, test and approve new machinery, evaluate jobs, study machinery layout. test and evaluate new materials, investigate customer complaints, determine standard machine speeds. and standardize manufacturing and processing procedure.

Quite a few mills have records which show that their standards departments have paid for themselves many times. While it is difficult to determine the exact dollar and cents your standards department is saving, due to many intangible savings, one can determine that the standards department more than pays for itself.

It takes a lot of nerve to wear one of those strapless evening gowns.

It certainly does . . . and a couple of other things.

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TEXTILE CLUB ACTIVITIES

PHI PSI

G. A. Mobley, TE '52

Iota Chapter of Phi Psi Fraternity has had a very successful semester, and we hope that our good fortune will continue. After the initiation held December 6, the membership was increased to thirty-six. Nineteen new men were initiated, including eight seniors, ten juniors and one sophomore. The new men are L. G. Boyd, Everett W. Clark, Robert M. Cook, William P. Creighton, Rodolfo A. David. Earl L. Dees, Jr., Olin H. Dunn, Rossie R. Fowler, Robert L. Garrison, Ralph L. King, Eugene H. Lehman, Otis W. Livingston, Jr., Sidney Merians, James M. Norris, Marvin C. Robinson, Joseph R. Shirley, Vernon M. Williams, Bennette E. Wilson and Alvin Zatcoff.

IN MEMORIAM

Along with all the other chapters of Phi Psi, Iota Chapter was saddened by the death of Mr. Harold H. Hart, Executive Secretary of the Grand Council. Mr. Hart was very active in the Fraternity and was a textile executive and member of the New Hampshire House of Representatives. He was one of the founders of the Fraternity, and took great interest in all its members, individually and collectively. He certainly deserved his nickname of "The Grand Old Man."

CONGRATULATIONS:

Although we strongly feel the loss of Mr. Hart, we are very fortunate in having as our new Executive Secretary Mr. John T. Wigington, Director of the A. C. M. I. here at Clemson. Mr. Wigington has been a member of Phi Psi since 1940 and has been active in the affairs of the Clemson Chapter. We are certain that we will benefit by Mr. Wigington's residence at Clemson, and hope that he will be here for a long time to come.

SOCIAL NOTES:

Defying a long established tradition of Iota Chapter, the doors of the Fraternity room in the basement of the Textile Building have been opened to all the students for use as a lounge and meeting place. The Coke machine which was obtained through the efforts of Walton Cassidy, our former president, has made this room a very popular place to sit down between classes and relax with the pause that refreshes. We feel that this has been a great benefit to the Fraternity, since it has created a great deal of interest among the textile students.

On January 7, the chapter had a Dutch supper in honor of the new members, since a number of them will be unable to attend the annual banquet because of graduation. The supper was held at Seigler's Steak House in Walhalla, S. C.

NEW OFFICERS:

At a special meeting called December 18, new officers were elected to preside over the chapter for the coming year. Those elected were George A. Mobley, President; Luther J. Sigmon, Vice-President; Bennette E. Wilson, Secretary-Treasurer; Paul R. Osborne, Senior Warden; and Ralph L. King, Junior Warden.

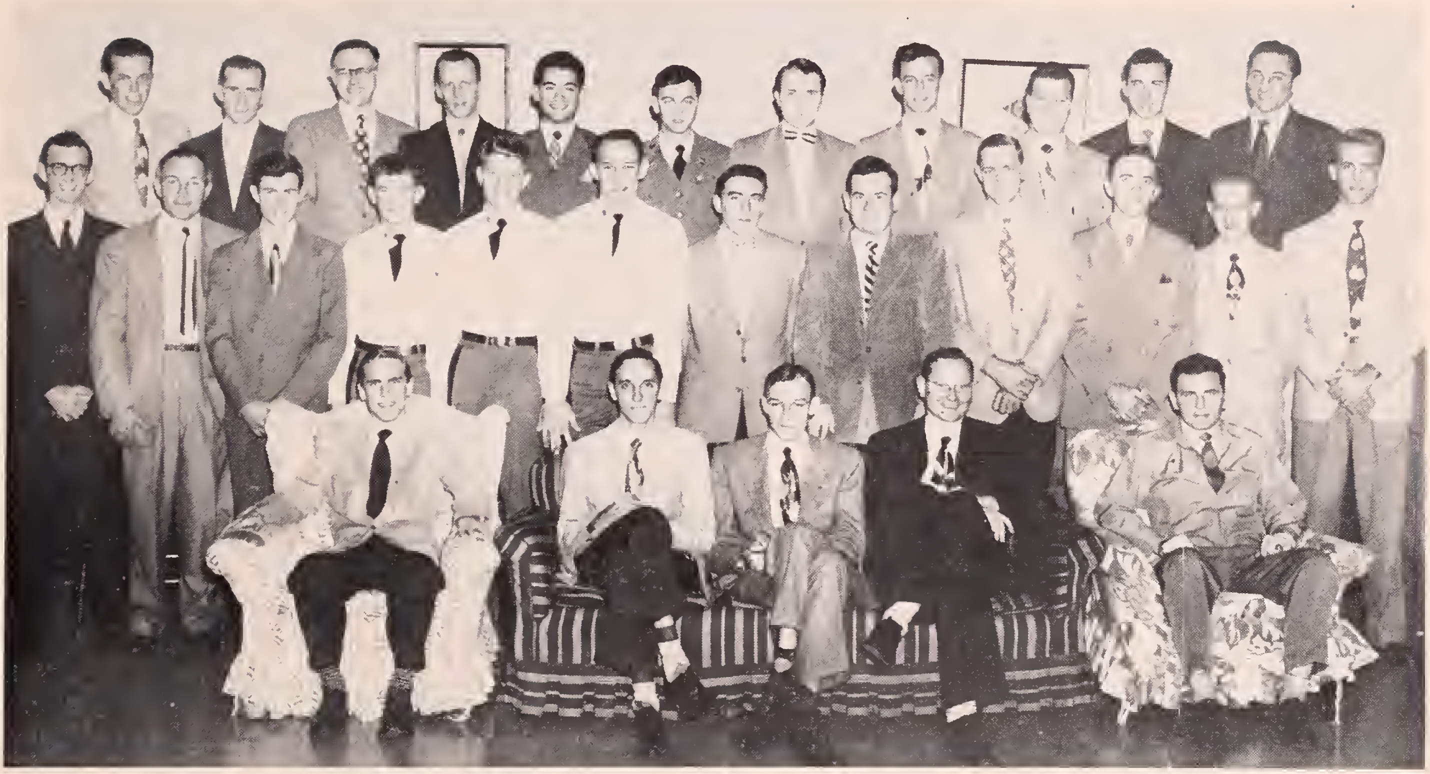
The retiring officers are Edward E. Cothran, President; Alvin H. Clarke, Vice-President; George A. Mobley, Secretary-Treasurer; F. Leroy Watt, Senior Warden and Luther J. Sigmon, Junior Warden.

N. T. M. S. NEWS

For many years, as the Textile Industry expanded and played a greater roll in the economy of the South, the enrollment in the School of Textiles increased accordingly. The School of Textiles came to have a greater enrollment than any other school on the campus, with more students enrolled in Textile Manufacturing than any other single major. With this great increase, the need for an organization which would bring about a more intimate relationship between the textile industry and the undergraduates of the Textile Manufacturing school became greater and more evident.

(continued on page twenty-four)

IOTA CHAPTER OF PHI PSI FRATERNITY



Back row: M. E. Price, M. H. Hance, V. M. Williams, L. G. Boyd, R. A. David, R. M. Cook, W. H. Walker, R. R. Fowler, J. H. Good, E. L. Dees, S. Merians. Second row: E. W. Clark, F. M. Welsh, R. L. King W. P. Creighton, R. L. Garrison, M. C. Robinson, O. H. Dunn, A. Zatcoff, J. R. Shirley, J M. Norris, B. E. Wilson, O. W. Livingston. Seated: A. H. Clarke, L. J. Sigmon, E. E. Cothran, G. A. Mobley, W. G. Holmes.

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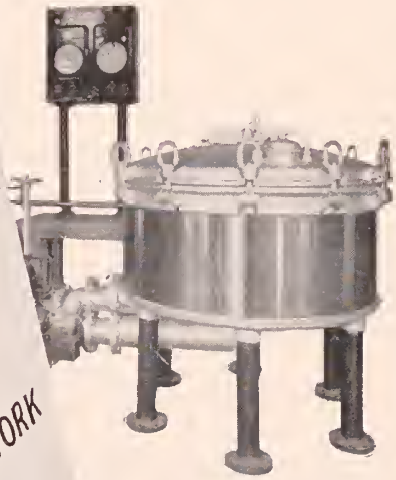

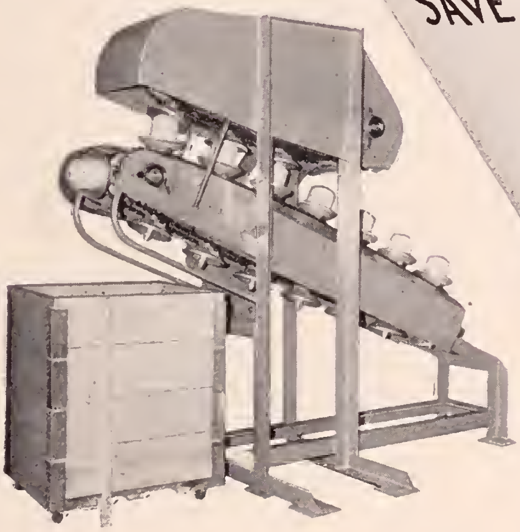

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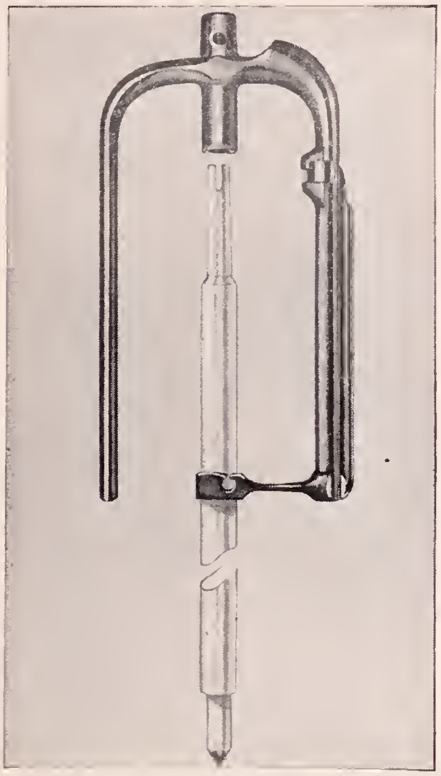

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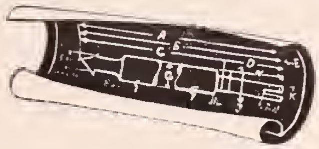

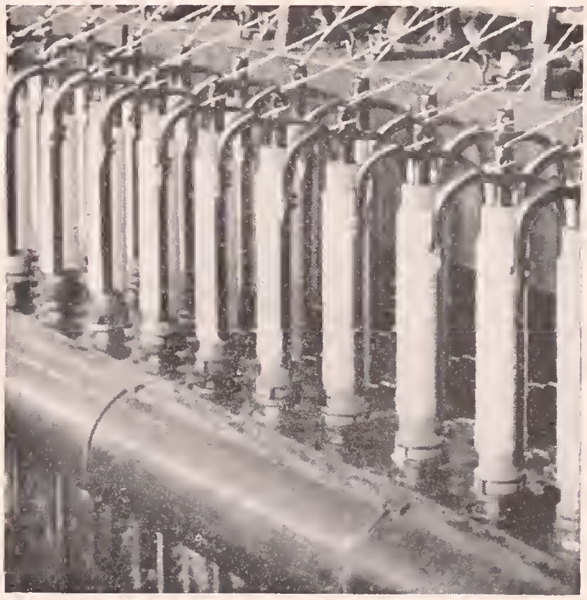

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As The Editor Sees It - - -

The most valuable asset to a student graduating from college is the contacts he has made during his years in school. Many boys, not realizing this, do not go out of their way to make acquaintances. This is a mistake. Everyone you meet, whether he is a student, a professor, or a total stranger, is a contact and a potential asset.

The students you meet and know can aid you in many ways. Through them, you can find out about other sections of the country, different cities, various industries, and numerous outlooks on life. It is not at all improbable that you may meet a future employer through a fellow student.

Professors, aside from their regular job of dispensing knowledge, are very important contacts to a student just finishing school and looking for work. Even if a professor cannot place you immediately, his favorable recommendation is worth a great deal. All through your school career, professors are a valuable source of information on practically any subject. Of course, you wouldn't ask an English professor about the operation of a knitting machine, but you can find specialists in almost any field.

Visitors to the campus, even though total strangers, may be invaluable when you go out to look for work. One person you meet may be an important mill executive, while another may be only a person looking for a job, like yourself. The trouble is that until you become acquainted, you don't know which one is which.

No contact is too unimportant to be ignored. If one is introduced to ten thousand people, chances are that nine thousand nine hundred and ninety-nine will be of little help in the final analysis, while the other one may mean the beginning of a very satisfactory career. The risk of missing that one makes it imperative that every opportunity to make a contact is taken advantage of.

Another peculiar thing about contacts is that they are like a snowball. Once started, they increase greatly as they progress. The writer has had some small experience in this phenomenon. From an acquaintance, he obtained the name of two men to contact in regard to summer employment. One of these contacts expanded into personal interviews with five other prospective employers. The other resulted in two separate interviews and immediate employment. These contacts will be well worth while when the writer starts to look for permanent employment upon graduation.

The editor wishes to take this opportunity to express his appreciation to all of those, who, through cooperation and hard work, have made this issue of the BOBBIN & BEAKER possible. We regret the tardiness of this issue, but due to no fault of ours, there were certain obstacles which had to be overcome before we could begin work.

NTMS NEWS

(continued from page eighteen)

There had been talk about forming such an organization for some time, but no one seemed to do very much about it until Walton Cassidy, Max Hance, Prof. T. A. Campbell, Jr., and some others got busy on the idea and really started the ball rolling. After several discussions, a meeting was called, and there was a large turnout for the charter meeting. A committee was appointed, rules, by-laws and a constitution were drawn up. The club was called the National Textile Manufacturing Society. Max Hance was elected president and now serves in that office. Other officers are J. T. Hardin, Vice-President; G. R. Shedd, Secretary; W. F. Bradley, Corresponding Secretary; J. R. Shirley, Treasurer; Dave Crawford, Master at Arms, and C. L. Rogers, Publicity Secretary.

At the beginning of the year, there were fifty-two old members in the club and thirty-five new members were added. There has been a number of interesting programs, both educational and entertaining. Included among the speakers were Dean Brown of the Textile School and Prof. T. A. Campbell, Jr. An interesting movie on the Reading Full Fashioned Hosiery machine was shown. Also some recent movies of Clemson's out of town football games. A key, which has the Coat of Arms containing a bale of cotton, a cone of yarn and a bolt of cloth was ordered and has been received by all of the old members. Another order is being prepared for keys for the new members. The club recently met and voted for a steak supper which is to take place in the near future.

Much progress has been made in the N.T.M.S. and with continued hard work and cooperation of the officers of the club, the class advisor, and the students in the School of Textiles, this can become one of the finest clubs on the campus and may spread to other schools having a Textile Manufacturing major, thereby becoming a national fraternity.

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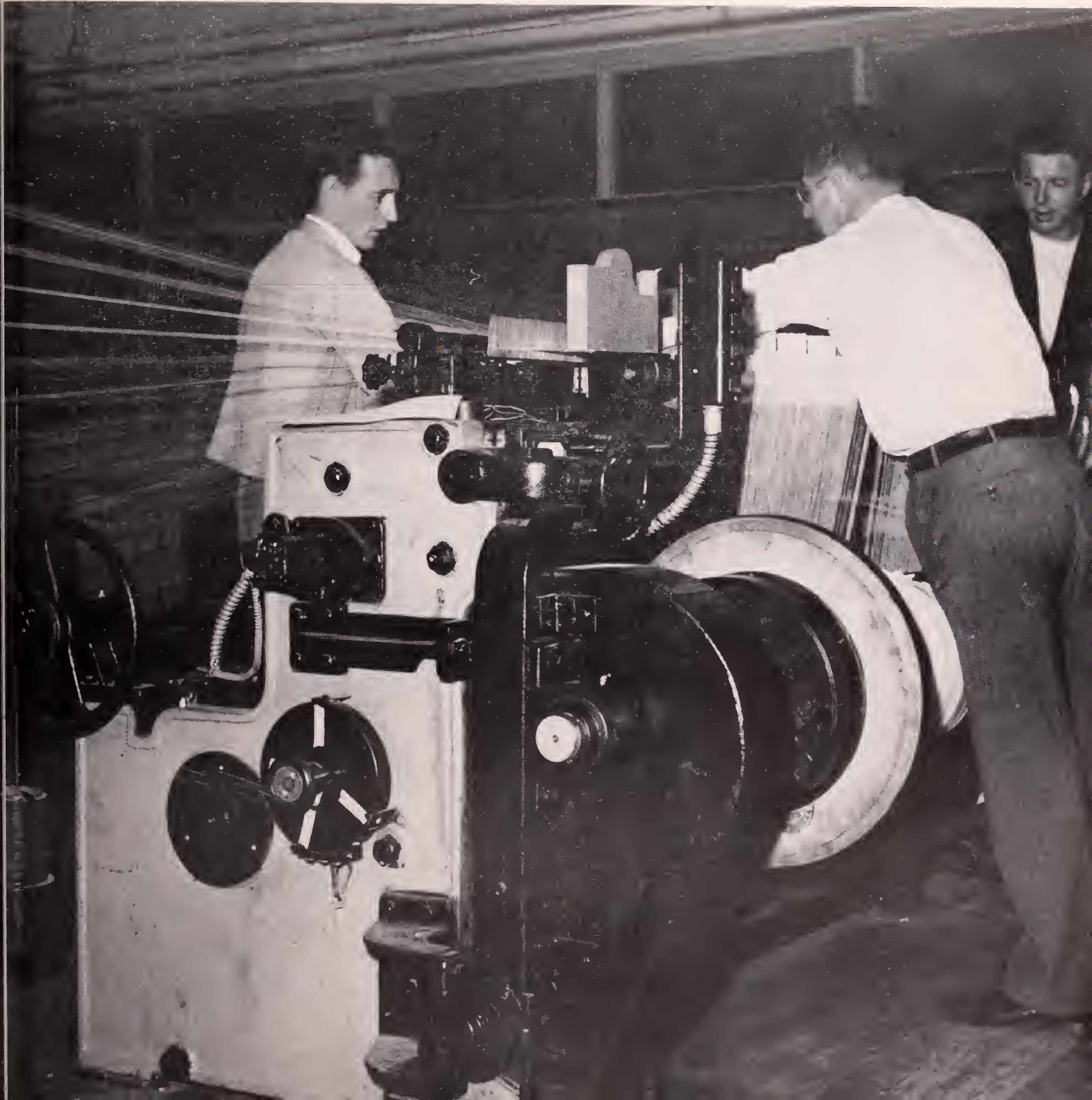

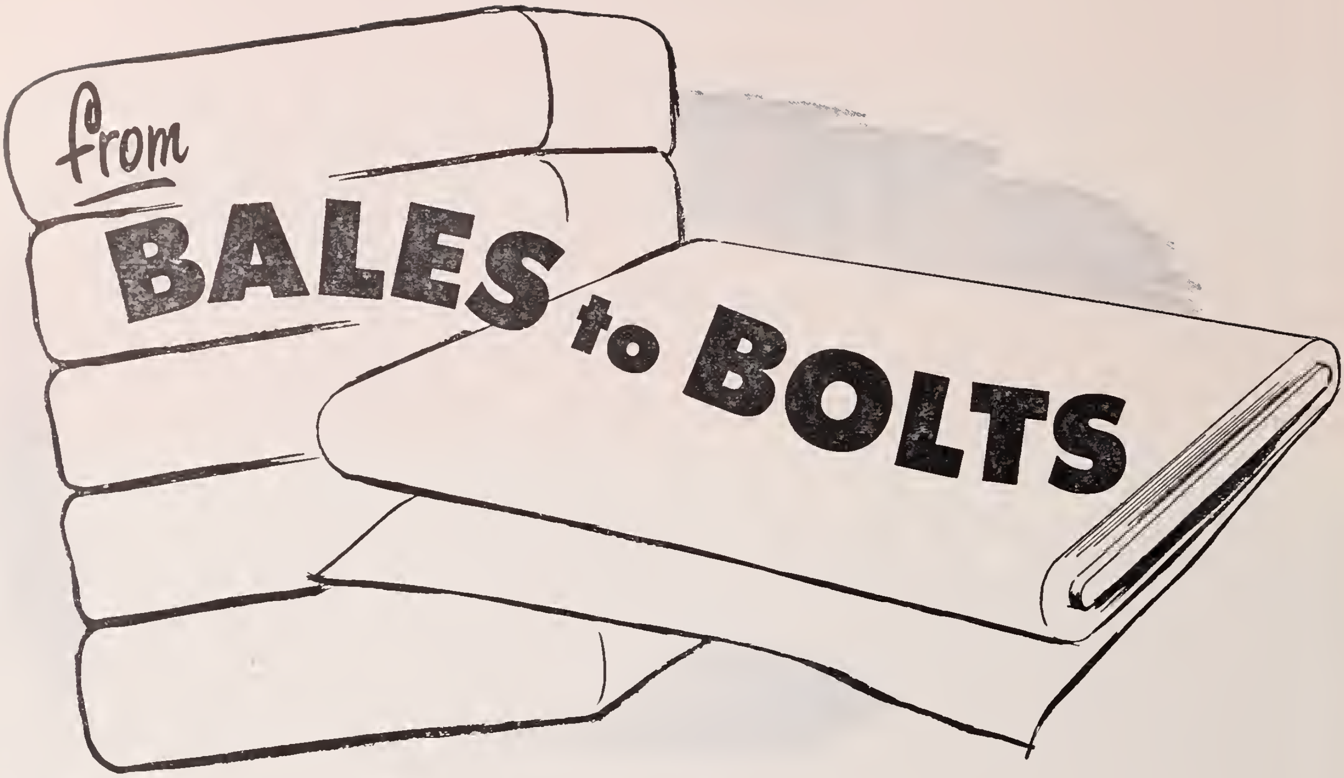

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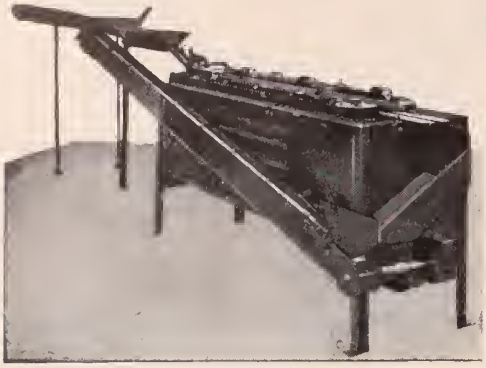

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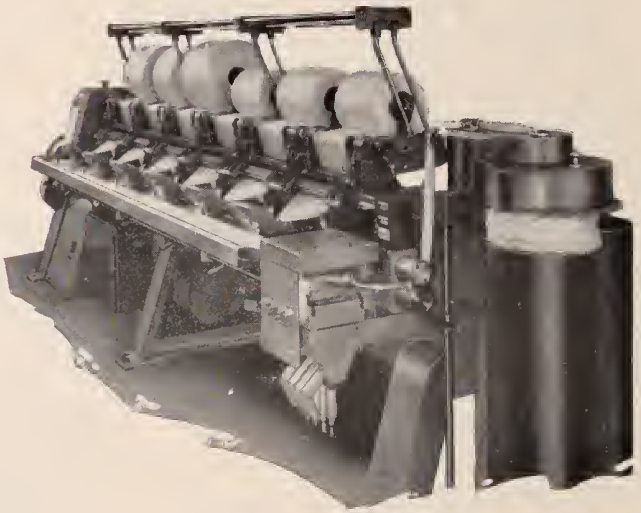

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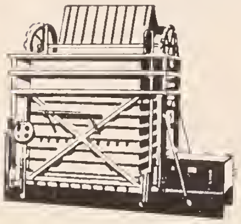

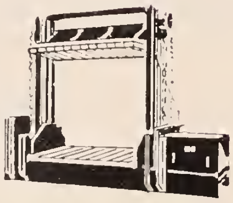

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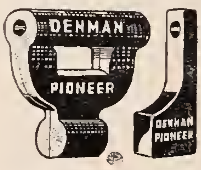

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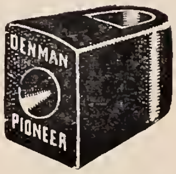

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Bobbin and Beaker

Official Student Publication
Clemson Textile School

VOL. 10 SPRING 1951-1952 NO. 2

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THE COVER

Professor A. E. McKenna instructs a group on the operation of a high speed rayon warper in a warp preparation class.

In This Issue

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THE BOBBIN AND BEAKER. Organized in November, 1939, by Iota Chapter of Phi Psi Fraternity, and published and distributed without charge twice during the school year by students of the Clemson College School of Textiles. All Rights Reserved.
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The Demand for Our Product

DR. HUGH M. BROWN
Dean of Textiles

The function of our textile school is first and foremost to train men and provide graduates fitted for the best possible service to textile industry. We take some pride in the fact that throughout the history of the school there has always been a greater demand for our men than we could meet. This has been true especially since the war due partly to the fact that all the schools, having reduced enrollment during the war had a backlog, so to speak, to catch up when the war was over.

A second reason for the demand was that both before and after the war the industry was increasing its percentage of college trained men. As would have been expected, the peak demand came the second and third years following the war, at which time we had calls for at least five times the number of our seniors. Then for two or three years the requests for men fell off somewhat, though still exceeding the supply. About a year ago we again had a surge of requests three or four fold larger than we could satisfy. The personnel manager of one larger company stated that he was looking for approximately one hundred graduates from the several textile schools, and all this semester we have had two or three companies per week seeking our graduates.

This tremendous call for men is certainly gratifying, though surprising, in view of the concurrent slump in textile markets and production. However, we believe the mills are making a wise move by increasing rather than decreasing their trained personnel, even when business is (we hope temporarily) somewhat slack. It may mean that the mills expect soon to again be on capacity production and are getting their personnel in advance of a greater need, or it may mean that the industry on the whole feels that it will require a better trained staff to survive heavier competition from both domestic and foreign industry. There may be many other causes for the present demand for men and we at Clemson have special reason to know that the industry is realizing more and more the importance of the textile schools. I refer specifically to our recent expansion program, which was made possible mainly by contributions from nearly every phase of the industry.

Our textile school has a secondary "product" that is growing in importance year by year. I refer to the increasing amount of research done by our staff and graduate students. Over the recent years the projects have included some new dyeing formulas for synthetics, new sizes for spun nylon, several new testing machines and more than a dozen machine improvements. Several research projects on special cottons have been completed for the government. The mills are more and more frequently showing interest and making use of this research. A number of companies are employing the school to do special research on their materials.

For the last several years the school has had staff members working on task groups of American Society for Testing Materials, and taking part in several other textile associations. All of this work inspires a research attitude in our staff and students.

I am happy to say that for our output, either of graduates or of research, we are gratified at the industry's demand and will strive to meet it with an ever improved product.

Funny people, these Americans. They take a glass, put sugar in it to make it sweet, lemon in it to make it sour, fill the glass with gin to make it hot, add ice to make it cold, then say "here's to you" and drink it themselves.

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Comments on the Results of the 17-Mill Test on Ginning Procedures

by Walter Regnery

Very important to the textile industry is the report recently published by the National Cotton Council giving the results from actual mill tests of spinning and weaving of cotton ginned under five different conditions in order to ascertain what ginning procedures are preferable. I urge the reader to get the full report. Here I shall give some observations which show the importance of this report to the industry.

Mr. Walter Regnery is vice president of Joanna Mills, Joanna, South Carolina.

WHY THE TEST WAS RUN

"Mechanization of the cotton industry has been accelerated, due in part to a shortage of labor. These rapid changes have increased the problems of gin machinery manufacturers and the cotton mills, as well as those of the farmer. Mechanical harvesting is one of the most important time and labor-saving developments in the cotton industry, and yet, from its use, a number of serious difficulties, both to the ginners and spinners, have arisen. Mechanically harvested and snapped cotton contains a much greater proportion of leaf and stem fragments than handpicked cotton from the same fields, and is correspondingly harder to clean. Ginners are, therefore, confronted with the problem of removing the excess trash without damaging the fibers. Moisture is added to the cotton picked by spindle type pickers and shortage of labor frequently results in a poor quality of handpicking. To meet this need, new types of cleaners and new ginning techniques have been developed.

"Cotton gins were, until mechanical harvesting was introduced, simple plants. Dryers were added to facilitate cleaning, and additional cleaning equipment was added to improve ginning performance. More recently, lint cleaners were added to extract trash from the ginned lint.

"Many spinners have claimed that while the grade is improved by these new ginning practices, the cotton is damaged to the extent that spinning performances and quality of the finished products are adversely affected. Independent mill tests have indicated that the quality, or spinning value, of the cotton is affected in ways that are not easily detected by the usual cotton classing techniques. In certain of these mill tests, sampling and ginning procedures were not sufficiently controlled to isolate the causes of the damage.

"The USDA reported improved grades without damage to the cotton when its experimental lint cleaner was used in combination with a limited amount of seed cotton cleaning machines. For all of the USDA experiments, there was an average increase of 2 neps per 100 square inches of card web, which was interpreted to be insignificant. The USDA studies, however, were done on a small scale and were more closely controlled than in commercial gins; therefore, comparable results on commercially operated gins were deemed necessary. The small increase of 2 neps/100 square inches of card web may be important in the manufacture of certain fabrics, even though statistically it was not considered to be significant. The pressure of above average neps in the card web and below average yarn appearance grades are indications of difficulties to be expected in dyeing and finishing the fabric.

"The USDA tests showed further that a fast rate of feed combined with the saw-cylinder lint cleaner produced a substantial increase in the number of neps per 100 square inches of card web. It was concluded that rapid feeding of the cotton in combination with excessive drying and overhead cleaning not only lowered the spinning quality of the cotton, but failed to improve the grade.

"A study was undertaken, therefore, to investigate on a commercial scale the effects of the use of certain ginning machines and variations in ginning operations on the spinnability of the cotton and the quality of the finished product. Representatives of each branch of the cotton industry, with the cooperation of interested governmental agencies and gin machinery manufacturers, set up this experiment to supplement the previous tests by commercial mills and the USDA. The cooperators in this present test are listed elsewhere in this report. The National Cotton Council acted as a liaison for the entire group and with the aid of the American Cotton Manufacturers Institute, Inc., served as a clearing house for assembling the data. The report was written with the aid of the Technical Sub-Committee.[1]

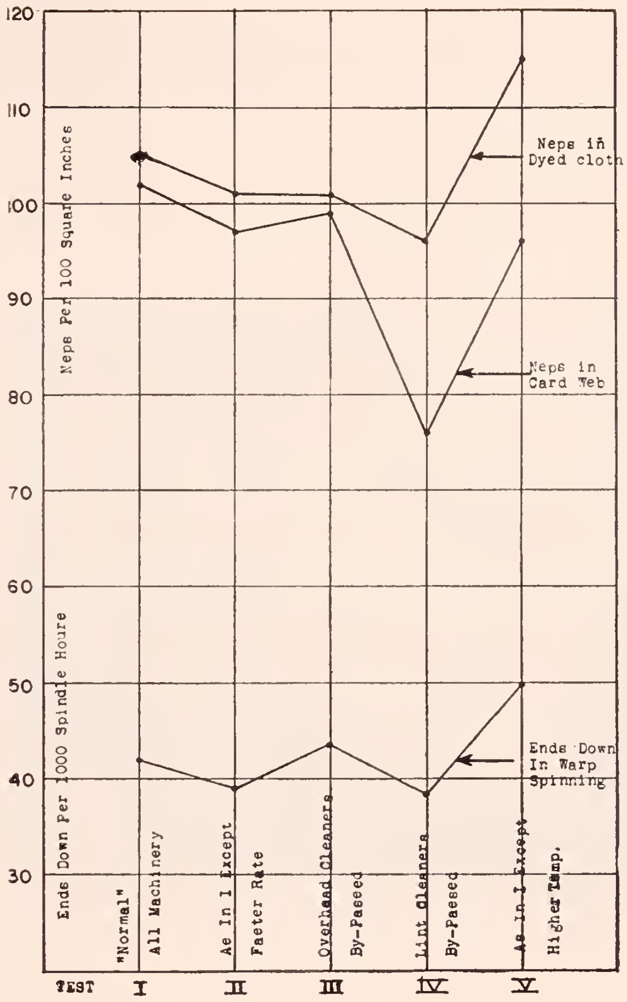
PROCEDURE OF TEST

"This report presents the results obtained from a large scale investigation of the effects of various mechanical operations and practices in cotton gins upon the spinning characteristics of the fiber and upon the quality of the finished fabric. The tests were carried out under commercial production methods in six gins, two each of three makes, and in 17 mills in which a great variety of equipment was used. The ginning tests were carried out in two main areas of the Cotton Belt, and in each area three pickings were made, one being hand-picked and the other two harvested by spindle type pickers, for each of the three makes of gins. Enough blended seed cotton was secured at each gin to produce 25 bales of lint cotton. At each gin five test runs of five bales each were made in accordance with the following schedule:

1. Without modification of the usual practice, so-called "Normal" ginning.
2. As in (1) except at a faster rate.
3. As in (1) except the overhead cleaners were by-passed.
4. As in (1) except the lint cleaners were by-passed.
5. As in (1) except at a higher temperature."[1]

I believe graph 1 shows the significant results of this test. To a print cloth mill, neps are one of the most important quality factors in their finished cloth. It is a factor that many times is responsible for cotton cloth losing its place in the market to synthetic fibers. Any improvement here, then, to any segment of the overall cotton producing or manufacturing organizations should definitely help either to hold the present market or increase the consumption of cotton. You will note on graph 1 two plots of nep results from these tests, one showing neps in dyed cloth, the other, neps in the mill card web, all of which results were made by one man at the USDA Laboratory.

Test four, where the lint cleaners were by-passed or where the cotton received the least amount of machining at the gin, gave a marked reduction in neps at the mill. In the case of the neps in card web, the count was reduced from 102 for normal to 76 in test four, a reduction of 25.5 percent or from 96 in test 5 with excessive drying to 76, a reduction of 20.8 percent. The neps in the finished cloth were reduced to 96 in test 4 from 105 in test 1 (or 8.6 percent) and from 115 in test five to 96 (or 16.5 percent). In other words, the tests show that a reduction in neps of 25.5 percent in the card web or 16.5 percent in the finished cloth can be made at the mill level by gin procedure.



Average Results from the 17 Mills vs. the 5 Gin Procedures

The reduction of 25 percent in the card nep count is very important to all concerned in our industry, and this improvement would be most difficult to get in any other way. For the mill to get this reduction, they would have to card at a slower rate. The average carding rate for the 17 mills was 9.5 pounds per hour. To reduce the nep count 25 percent would estimate, from tests that have been run in carding rate vs neps, that this would have to be reduced to 7 pounds per hour. In the case of a 100,000 spindle print mill this would mean the addition of 80 cards, with an investment cost of $320,000. These extra cards would cost the mill about $25,000 in additional direct labor cost per year to operate. In other words, the ginners should use great caution in either overdying or overmachining the cotton, as it well might add so much to mill costs or add so many neps to the finished product that cotton will be replaced by synthetic fabrics.

(continued on page sixteen)

LINTHOUSE PERSONALITIES

By Inman Howard '53

PROFESSOR A. E. McKENNA

" That's right, huh? "

Those who dare enter the Textile Building for any purpose are bound to get a glimpse of Dr. McKenna going about his business. If you want to catch him for something, I suggest you get a bicycle or head him off coming down a narrow hallway. Dr. McKenna's job as the Head of Weaving and Designing Department and teaching Warp Preparation has its many duties which make him a busy man.

Mr. McKenna was born at Barrington, Rhode Island. He is married and has a daughter attending Montreat College at Montreat, North Carolina. After finishing Leander Peck High School, Barrington, Rhode Island in 1919, Mr. McKenna entered Rhode Island School of Design and received his diploma in Textile Design in 1922. Desiring to get into industry led to employment with Mount Hope Spinning Company at Warren, Rhode Island. Leaving this organization he went with the Warren Manufacturing Company of Warren, Rhode Island and then to Houston Cotton and Twine Mill, Houston, Texas enriching his practical experience at each. Desiring to further his education, during his employment at the Warren Manufacturing Company in 1925, Mr. McKenna entered the Bradford-Durfee Textile School, which is now Textile Institute located at Fall River, Mass., completing a course in Spooling, Warping and Slashing for thirteen weeks, two evenings a week.

Having been born in the North, Mr. McKenna knew what is was like; having been in the South west he knew what it was like. Deciding there must be a better place than these he came to Clemson, South Carolina in September 1925 as Instructor in the Weaving and Designing Department and has been a resident of Clemson since, with minor interruptions.

In 1930, Mr. McKenna took leave of absence for a year and completed requirements for a B.S. degree in Textile Engineering here at Clemson. From 1930-33, while teaching during regular semesters at Clemson, Mr. McKenna attended the University of Tennessee during summer sessions and received a Master of Science degree.

Professor McKenna has taught many subjects in Weaving and Designing. His present course in Warp Preparation is a very important course as we all know or have been told that the warp has to be properly prepared for best results in weaving.

In addition to teaching, Professor McKenna is co-author and author of several articles for **Rayon Textile Monthly.** Among those of which he is co-author are: Leno Weaving and Design, 1934, and Weaving Fancy Meshes on the Slotted Steel Doup, 1934. He is author of the following: Methods of Englaring Jacquard Designs, 1931; Dobby Design, 1932; Woven Tucks, 1933; Leno Weaving With Two Crossing Ends, 1933; and Multiple Cams, 1936. Articles which appeared in Textile World of which Professor McKenna is author are: Two sets of Doups, 1941; and Yarn Diameters, 1946.

He is active in several clubs and fraternities, including Iota Lambda Sigma, Phi Psi, Masons, American Association of Textile Technologists. He is also Governor of South Carolina Society Mayflower Descendents.

* * *

Angry father to son: "Why don't you get out and find a job? When I was your age I was working for $3 a week in a store, and at the end of five years I owned the store."

Son: "You can't do that nowadays. They have cash registers."

PROFESSOR W. E. TARRANT

" You boys will do well to listen to what I've got to say."

Mr. Tarrant, better known as Crowfoot, was born at Piedmont, S. C. After finishing high school and desiring to further his education, he looked over the school situation for the best one and decided to enter Clemson College from which he graduated with a B.S. degree in Textile Engineering. While in college, Mr. Tarrant worked in the weave room during summer vacations in the following mills: Piedmont, Dunean, and Watts. After graduation, Mr. Tarrant was employed by the Graniteville Mill obtaining experience in carding and spinning. He returned to Clemson in 1928 as instructor in the Weaving and Designing Department.

In 1930, Professor Tarrant left Clemson for a position as head of Weaving and Designing Department at Alabama Polytechnic Institute at Auburn, Alabama. During his stay at Auburn, he taught loom fixing in the summers at the near-by Pepperell Mill.

In the fall of 1936, Professor Tarrant returned to Clemson as Assistant Professor in the Weaving and Designing Department. While teaching at Clemson he entered Pennsylvania State College in the summer months and graduated with a Master's Degree in Education. Utilizing all available time, Professor Tarrant again broadened his practical experience by employment at the Newry and Inman Mills during summer vacations.

In 1942 Mr. Tarrant was called into active service as First Lieutenant in the Air Force. While in service Lt. Tarrant taught academic subjects in Preflight School and served as a Vocational Guidance Officer at a separation center. After release from the service, Mr. Tarrant returned to Clemson in the Fall of 1946 where he has remained since. At present, he is teaching Dobby and Box Loom Mechanisms, Fabric Design, and Warp Preparation.

He is Commander of the American Legion Post at Clemson and a member of several clubs and fraternities. Among these are: Honorary member of Phi Psi, member of Sage Club, and Iota Lambda Sigma.

Professor Tarrant is married and has two children. A daughter, Carolyn, is a student at Winthrop; a son, Edward, Jr., is a student at Calhoun-Clemson High School.

A little boy wanted $100 so he decided to pray to God for it, since everyone said He always granted one's wishes. He prayed every night for two weeks, and still no $100. Then he decided to write God a letter about it. When the postal authorities received the letter, they didn't know where to send it so they forwarded it to the President. After due course the President read the letter, chuckled and told his secretary to send the boy a five dollar bill, as that would mean a lot of money to the child. When the boy received the money, he was delighted and wrote God another letter thanking Him for his prompt reply and said, "I noticed that you routed your letter through Washington and as usual, those crooks deducted 95 per cent."

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You Must Create Interest in Safety

By W. Bratton Williams

Clemson College Textile School, Clemson, S. C.

A digest of a speech before the Textile Section of National Safety Congress in Chicago, Illinois, October 8, 1951; written for this issue by Mr. Williams. Mr. Williams is an instructor of Weaving at Clemson.

Every year in the United States approximately 18,000 people are killed while at work. At the same time approximately 2,000,000 people receive some form of injury while at work. During the first year of the Korean war, we had approximately 9,000 men killed in action, while our total casualties killed, wounded, and missing in action totalled about 78,000. Also, during that first year here in the United States, in all forms of accidents, there were approximately 10,000,000 injured and 95,000 killed. According to these figures, it is safer to be on the Korean front than it is to be living within the peaceful bounds of the United States.

Only last week I read in the papers, and this came from the National Safety Council, there were 3560 people killed in motor vehicle accidents in the United States during the month of August. This is the highest monthly toll on record for any one month with the exception of August, 1941, when almost 3900 were killed. Highway safety has become one of the most serious problems facing us today. Will our killed and injured continue to increase in number or will we become better educated in safety?

You must create interest in safety. You must educate your people in safety.

Why should we be so vitally interested in accident prevention? "Am I my brother's keeper?" The two basic reasons for accident prevention are the humane reason and the economic reason. We do not like to witness physical human suffering, therefore, the basic reason for accident prevention is the humane basis.

Accidents don't happen, they are caused. Then the way to eliminate accidents is to discover and eliminate the causes. We are taught in safety engineering that all accidents fall under three causes: (1) Unsafe conditions; (2) Unsafe acts of persons; and (3) Acts of God. The first two causes are man-made and can be controlled by man and 98 percent of all accidents fall under the first two causes or a combination of both. The third cause, Acts of God, are responsible for about 2 percent of our accidents such as lightning, floods, tornadoes, and over these we have no control. What, then, is your part in accident prevention? Recognize and eliminate unsafe conditions and unsafe acts of persons. The second cause, unsafe acts of persons, is far more difficult and far more important.

It is too late to eliminate unsafe acts of persons after the unsafe act has been performed and the accident has occurred. It is far more important to train your people to be safety conscious and accident minded so that they will anticipate and not perform the unsafe acts.

What is safety education? According to one expert, it is the process of imparting knowledge of safe and unsafe conditions and of safe and unsafe acts of persons.

Men in industry have responsibilities for production, cost, quality, waste, etc. During the past few years, men in industry have assumed another responsibility, that of safety. This is becoming more and more important and I am glad to see more emphasis being placed on safety than ever before in the history of the country.

Thousands are being born every day and these same thousands as they grow up, must receive public school education and training if they are to grow up to be useful citizens in this great land of ours. Public schools throughout our country teach health education. The purpose of this is to help eliminate sickness and death from diseases. Likewise, I believe that it is just as important that public schools and colleges throughout the land should teach safety education. Is not this just as important as health education?

You have heard of the three E's of safety: Engineering, Enforcement, and Education. You cannot create safety by mechancal guarding or by enforcing rules. You must educate for safety. You must create interest and enthusiasm for safety.

(continued on page eighteen)

"Mr. Whit" and "Mr. John" Retire After Total of 75 Years of Service

"MR. WHIT"

By W. H. Walker, '52

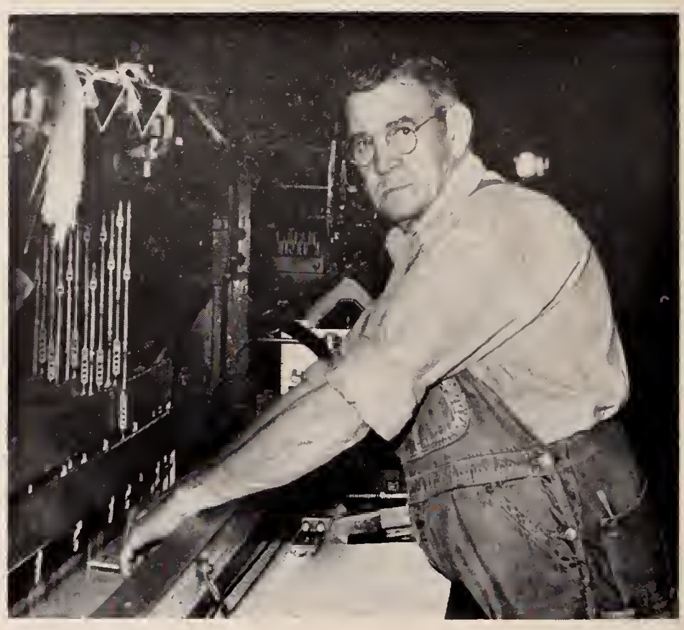
An old and familiar face to textile students—Mr. Whit Dillard—will be noticeably missing after July 1st. He has faithfully served the Textile School for 49 of his 51 years of service with Clemson College, and now is retiring.

"Mr. Whit," as he is fondly called, has seen a lot of colleges in his day, but in his own words, "Nothing compares to Clemson—I'm 100% for it!"

In 1903 Mr. Whit became connected with the Textile Department and since then has seen many changes—for instance, the Textile Building was originally located in the present Physics Building. He helped move the machinery from the Calhoun Railroad Station to that building with the help of state prisoners who were located here at that time.

Mr. Whit is an ardent football fan—he boasts that he has missed only one home game, and that happened in 1921! Since he is retiring, he says that he is going to enjoy another of his favorite sports, fishing. Also, he is planning to devote much more time to his garden.

"MR. JOHN"



By A. H. Clarke, TM '52

An article on "Mr. John" was printed in a recent issue of this magazine in order that students may recognize this man often seen in the textile building. However, we won't be seeing "Mr. John" around as often as before because he is entering into that phase of life so eagerly awaited by most young men—retirement. I say young men because it seems that when the time for retirement arrives, the retiring man does not usually aspire to put aside something at which he has spent a lifetime. This is at least true in Mr. Willis' case. He said it was not his idea to retire, but the age limit requires it. But after 24 years of service with Clemson, he undoubtedly deserves a rest.

Mr. John says he retired from hunting and fishing many years ago. His luck probably accounted for that decision. His main interests are in gardening and ball games. Retirement will permit him to spend more time with these activities.

Mr. John lives in Clemson, so I guess we will still see him around town quite often.

Where Are They Now?

R. F. Compton, T.M. '54

With graduation coming around once more, Clemson will again be sending young men into the textile world, a world that holds unlimited possibilities for the trained, ambitious young man.

These men will not be alone in the vast textile world, they will be aided by numerous former graduates, a few of which are listed here as evidence of the progress made by Clemson men.

Among former graduates at Beaumont Mills in Spartanburg are: J. L. Adams '29, Superintendent; L. Earl Bagwell, Jr., '32, Assistant Superintendent; Brooks Patterson '49, Carding Overhauler; George Dickerson '41, Assistant Overseer (Carolina Textiles Division); James P. Parnell '51, Carding Overhauler; Charles V. Good '36, Standards, Cost and Production Manager; Murray N. Turner '51, Spinning Department, (now on military leave); Jackie Calvert '51, Time Study, (now on military leave); James H. Turner '51, Weaving Department, (now on military leave); Perry M. Judy '48, Time Study; Stanley Lancaster '41, Night General Overseer.

With Watts Mills in Laurens, are: T. P. Townsend '29, Manager; Harry B. Iler, Jr., '48, Overseer of Preparation; William M. Washington '47, Assistant Overseer of Weaving; Harry G. Batson '51, Rate Checker in Standards Department; Raymond E. Patton '51, Trainee; Ralph C. Byers, attended Clemson, '45-'46, Supervisor of Wage and Rate Department; William C. Broughton '45-46, Rate Checker in Standards Department.

Former graduates with Laurens Mills are: Thomas C. Hunt '33, Master Mechanic; Archie T. Wilbanks '49, Supervisor of Planning Department; T. L. Timmerman '43, Lab Technician; Jack W. Armstrong '48, Second-Hand; John E. Koopman '48, Second-Hand, Weaving Department; F. Wates Adams '52, Standards Department Trainee; and Charles W. Patterson '50, Loomfixer.

Along with G. G. Simmions '26, General Managei of Drayton Mills, are these Clemson men: J. L. Caldwell '31, Assistant to Superintendent; M. B. Self '34, Training Director; J. G. Farrel '21, Cost Accountant; W. K. Lee '42, Master Mechanic; Carl R. Rogers '50, Supervisor; Glynn E. Scott '39, Twister Fixer; and William Bolt 49, Trainee.

Clemson graduates with Inman Mills, Inman, S. C., are: E. L. Ramey, General Manager of Inman and Riverdale Mills; Z. G. Willis, Night Superintendent; Lewis W. Thompson, Research Engineer; Furman League, Assistant Overseer of Spinning; Joe Wyse, Training Program.

With Riegel Textile Corporation, Ware Shoals, S. C. are: Charles S. Black, Overseer of Bleach House; William J. Erwin, Vice-President and General Manager; William Davis Inabnit, Chemist; Riegel Development Laboratory; James Baron McN-inch, Finishing Production and Planning; Thomas Hopkins Peake, Jr., Chemist, Central Control Laboratory; Julian W. Shirley, Chemist, Riegel Development Laboratory; Grover C. Henry, Second Hand, Preparation Department; Malbourne G. Michael, Finishing Trainee; Paul Belton Skinner, Mill Production; William Nesbitt Smith, Overseer, Fork Shoals Plant; George Manning Taylor, Assistant Mill Superintendent; and John Carlton Thompson.

Former graduates with Rock Hill Printing and Finishing Company, Rock Hill, South Carolina, are: W. H. Grier '23, Vice-President and General Manager; Robert F. Drennan '42, Service Division; T. A. Jeffords '48, Formula Clerk, Color Shop; A. H. Hand '48, Formula Clerk, Color Shop; J. M. Bennett '38, Executive Assistant; W. H. '29, Head of Control Laboratory; Dave Cranford '43, Chemist; Paul G. Plexico '23, Invoicer; W. T. Jenkins, Jr., '43, Junior Engineer; W. P. Clements '30, Superintendent of Rayon Division; W. B. Roach '34, Assistant Engineer of Power Plant; C. K. Chrietzberg 1899, Office; A. G. Fisher '32, Rayon Dyer; R. O. Watson '49, Chemist; and W. K. Hammett '51, Research Chemist.

With Cone Mills Corporation, Greensboro, N. C., are: Marion W. Heiss '18, Vice-Presndent; Arthur Rollins '48, Overseer, Carding Revolution Division. With Schneider Mills, Taylorsville, N. C., are: Mr. Albert Schneider '44, Vice-President-Manager; Mr. B. A. Chestochowske '43, Assistant to the Manager. Employed at Kendall Mills, Charlotte, N. C., is Quay Hood Fellers '50, Assistant Overseer in one of the weave rooms.

Clemson men with Republic Cotton Mills, Great Falls, S. C., are: A. E. Williams '47, Superintendent, No. 1 Mill; C. J. Taylor '47, Shift Foreman of Weaving, 1st Shift; M. H. Smith '48, Overseer Slash; E. W. Barnette, Jr., '50, Assistant Designer; W. E. Lindsay '47, Sample Designer; G. E. Faulkenberry '29, Superintendent Dyeing; I. W. Gerrett '38, Superintendent Planning; and Albert H. Morrison '50, Standards Department.

Advancement in Testing -- The Instron

D. H. Witt

With the addition of the Instron Tensile Testing Instrument recently, the testing equipment of our school has been greatly increased. As a matter of interest, included also in the testing laboratories here are: The Pacific Evenness Tester, The Uster Evenness Tester and The Brush Uniformity Analyzer. These machines have opened a wealth of information to the students and the faculty for making comparasions, research, and analyzing the products being made on the various machines. Clemson is greatly benefited by having these evenness testers and the new Instron machine, not only for its own use but as a help to the mills who are interested in research. To date, only Lowell Textile Institute and Clemson have added the new Instron to their equipment in testing fibers and fabrics in the textile schools.

The Instron Tensile Testing Instrument has been proved to be a high precision electronic testing device. It makes possible the testing of a broad variety of materials, over a wide field of test conditions of load and speed. While Clemson's Instron will be used in connection with textiles, the machine has almost unlimited possibilities of unique testing techniques on many products. As an indication to this the manufacturer states as follows: "The Instron is built to measure accurately over a wide range of conditions, the load-elongation properties of such materials as:

Textile fibers, yarns and fabrics
Plastic films, coated materials and laminates
Rubber, paper, rope, leather, adhesives
And similar fibrous or non-fibrous specimens."

In explaining the operation, the Instron utilizes an electronic weighing system for indicating the load applied to the sample. The bottom jaw, which pulls the sample, is operated by a drive which provides an absolutely controlled rate of elongation of the sample over many speeds and in either direction. The Instron has instant reversability which is accomplished by fast acting computer-type magnetic switches. On the movable crosshead is mounted the pulling jaw which is operated vertically by twin screws designed specially to eliminate back lash. A servo-controlled amplidyne drive provides the power to pull the crosshead. Due to the instantaneous reversibility of the Instron, cycling and fatigue tests can be performed on cloth samples very easily. Automatic switches which can be adjusted very accurately are used to control the gauge length, the cycle points, and other functions desired. The machine can also be operated manually from the control panel. Also provided are quick traverse switches for accelerated positioning of the crosshead.

The standard jaw speeds are from .02 to 20 inches per minute in twelve steps. Different jaw speeds are obtained by changing light gears in a small compartment on the front of the machine. The standard chart speeds are from .2 to 50 inches per minute in ten steps. The load recording system consists of sensitive load cells made on the electric strain gage principle. Electrical signals are produced by the load variations and are amplified to operate a graphic recorder. The chart and jaws are driven synchronously, thereby giving a load-elongation curve of the materials. (the elongation being at a constant rate). Load ranges are determined by the cell used and cells range in capacity from 2 grams to 1000 pounds. The Instron here is equipped with Cell D which has a group of ranges from 20-1000 pounds. Since the arrival of the Instron at Clemson, jaws have been made for the ASTM grab strength test and spools have been mounted for standard skein tests.

This semester for the first time the textile seniors are being introduced to the Instron and they will learn of the wide possibilities of its use in research. The Textile School is proud of its new Instron and it is the hope that both the industry and the school will benefit by the results obtained from this precision testing instrument.

After a tough fight, the bomber was approaching its base. Just as the pilot, over the intercom, was giving the crew landing instructions, the engineer, in an agitated tone, cut in:

"Sir, we're very low on fuel, and I've just discovered that our landing gear has been shot away. What'll we do?"

The pilot thought a moment, then shouted back: "All right, you guys. We're almost out of gas and we've lost our landing gear. So you'd better stick your feet out of the bomb bay and start running like blazes."

As you enter mill life you will do well to learn all about Reiner equipment, its mill-proved record of all around excellence. The Reiner production program covers a wide range of machines—all top performers in their field. As your responsibilities grow with the years and decisions have to be made—remember Reiner for trouble-free, highest speed quality production in the fields listed below:

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RESULTS OF GINNING PROCEDURES

(continued from page seven)

The graph on ends down on spinning shows the same result as that of neps. These figures, too, are very significant to the spinner and therefore should be well noted by the ginner. Thirty-eight ends down, as shown for test 4, is about the maximum the spinner can have and still maintain his operative work load. Any higher than this would require a smaller work assignment or a lowering of the spinning production to bring the ends down back to standard. Either of these changes would result in higher manufacturing costs, making cotton less competitive with other fibers. Forty-nine ends down, as was the average for test 5, would require the change to be made.

The test also showed that overdrying and maximum machining at the gin resulted in lower yarn strength, as well as lower cloth strength. The amount of this difference was small, but the results were all consistent from mill to mill. The strongest yarn and cloth were made from test 4 cotton.

The average grade from test 4 came out 92.1, or SLM—, whereas the grade from test 5 was 95.4, or SLM+. On today's market, test 4 cotton would have a value of 38.80 cents[2] and test 5 a value of 43 cents[2] per pound. The waste at the mill for tests 4 and 5 ran 11.53 cents and 10.20 cents, respectively. From these figures we can calculate the cotton cost on 100 pounds of finished cloth as follows:

Test 4

Cotton	111.5 lbs. at 38.80	(2)	$43.,26
Waste salvage	11.5 lbs. at 20c		2.30
Net cotton cost 100 No.			$40.96

Test 5

110.2 lbs. at 43.00	(2)	$47.39
10.2 lbs. at 20c		2.04
		$45.35

From the above we see that it would cost the mill 4.39 cents pound less to produce cloth from test 4 than from test 5. This cloth would be stronger and would have 16.5 percent fewer neps. The lowest grade cotton gave the best and cheapest cloth

The ginner has been adding machinery to his equipment in order to produce cleaner cotton that will come out with a better grade. The cotton farmer takes his seed cotton to the gin that he feels will give him the best sample of ginned lint. We have seen from this extensive test by actual mill runs that blindly following this procedure might hurt everyone. The farmer and ginner might well lose the market to synthetic fibers. The mill will get a poorer raw material which will either turn out an inferior product or one that has a higher unit cost.

This cooperative test, involving all segments of the industry, has clearly demonstrated a dangerous trend in ginning procedure. It proves that the new additional machinery being added to the gins must be operated with great care and skill to prevent real damage to the cotton fiber. The test has clearly defined the problem.

I believe the true cooperative spirit that exists between the farmer, ginner, and spinner can put these facts to good use and make cotton into a better product, better able to compete with synthetic fibers. If these facts are not used, cotton will be in a dangerous position.

(1) "Cotton Fiber Properties, Spinning Efficiency and Quality as Affected by Ginning Practices." Burt Johnson N.C.C.

(2) Based on Anderson-Clayton Company quotation, Delta Cotton landed group B mill point, March 10, 1952, May Spots at 40 cents.

STANDARD-COOSA-THATCHER JOINS INSTITUTE OF TEXTILE TECHNOLOGY

The Standard-Coosa-Thatcher Company of Chattanooga, Tennessee, has joined the Institute of Textile Technology, according to an announcement by Mr. R .C. Thatcher, President of the company.

Standard-Coosa-Thatcher manufactures high-quality yarns and sewing threads at mills located in Piedmont, Alabama, Gadsden, Alabama, Rossville, Georgia, and Chattanooga, Tennessee. The mills contain 143,000 spindles.

The first S.C.T. mill began operations sixty years ago in Piedmont, Alabama. Two years before that, A. G. Thatcher and Jacob Barlow were operating the Barlow and Thatcher Spinning Company at Henry Clay, Delaware.

While operating the Delaware mill, they formed the Coosa Manufacturing Company in 1891 and interested other men, including W. Lane Verlenden and J. W. Hawke in the Southern mill.

In 1896 the Delaware mill was discontinued, and consolidation with the Coosa Manufacturing Company was made. This consolidation gave the company a total of 15,000 spindles.

From this beginning, Standard-Coosa-Thatcher has grown into a three-state operation which is widely recognized for the quality of its products and the character and skill of the people associated with the mills. Seventy-one percent of the employees have been with S.C.T. for more than five years, according to a booklet recently released by the company.

Put Your Sizing Problems on Textile Shoulders

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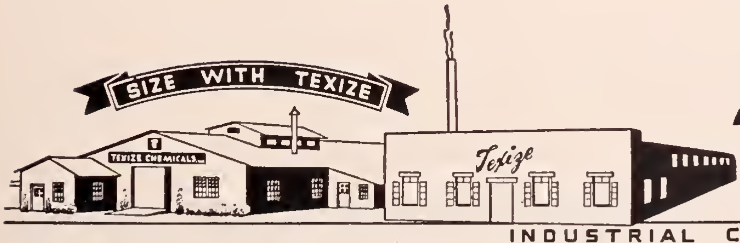

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PHI PSI NEWS

G. E. Wilson, T.M. '54

NEW MEMBERS

Iota chapter of Phi Psi initiated nine new members into the brotherhood this semester. Four seniors, four juniors and one sophomore were initiated April 24. The new members are Gilbert W. Ballentine, Marshall B. Bridgman, Harold E. Bradberry, Ernest J. Gilliland, Charles R. Mabry, Julius Melnyk, Paul S. Monty, Charles E. Mundy, and Charles L. Rogers. Iota chapter now numbers thirty-three.

NATIONAL CONVENTION

Iota chapter is anticipating with pleasure the honor of being host to the National Convention of Phi Psi, to be held at the Clemson House May 1, 2, and 3. Delegates will begin arriving at the Clemson House the evening of April 30. The mornings will be taken in business sessions. During the afternoons, the delegates will be divided into groups and escorted on tours of the School of Textiles, several of the modern mills in the vicinity and other points of interest.

SOCIAL NOTES

The annual Phi Psi banquet was held Friday night April 18 in the main dining room of the Calhoun Towers in Greenville S. C. Guest speaker was Dr. Joseph L. Vaughan president of the Institute of Textile Technology at Charlottesville, Va. Dr. Vaughan chose as his topic 'Interluckability of Research in the Textile Industry,' an interesting and informative address on the problems confronting the industry today. Guest of the fraternity included their wives; Dr. Vaughan; Mr. John T. Wigington; Dr. Hugh Brown, Dean of the School of Textiles, and Mrs. Brown; Dr. Norman C. Armitage, head of the research division of Deering-Milliken mills; and several members of the faculty and their wives.

GRADUATING

Congratulation and best wishes go to fifteen members graduating in June. Graduating are Gilbert W. Ballentine, Ray L. Broadwell, Alvin H. Clarke, Olin Dunn, James H. Good, Ralph L. King, Eugene H. Lehman, George A. Mobley, James M. Norris, Paul R. Osborne, Charles L. Rogers, Joseph R. Shirley, Jr., Luther J. Sigmon, John T. Snee and William H. Walker.

YOU MUST CREATE INTEREST IN SAFETY

(continued from page eleven)

One of the first jobs of a successful teacher, regardless of his subject, is to create in the minds of his pupils an enthusiasm for and an interest in that particular subject. Likewise, if you are to educate your people in safety, you must create in their minds an enthusiasm for safety. You must make them want safety. When you have done this the safety program in your plant will have become fairly well established.

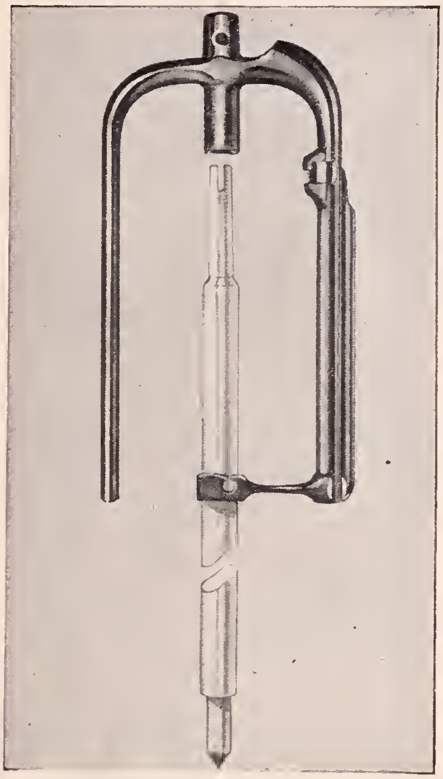
How are you going to get your people interested in safety? Certain of us have sensitive spots that are easily touched. These may be called Motivating Characteristics and some may be appealed to in one way while others may be appealed to in other ways. Some methods of appeal are as follows: First, you may appeal to a majority of people with emphasis on the idea of self preservation, or fear of personal injury. This is the strongest motivating characteristic and will touch the majority of people. Second, you may appeal to some with the idea of personal or material gain, such as bonuses, personal gifts, days off, etc. Third, others may be appealed to through their sense of loyalty to their foreman or to the company for which they work; such as, effect of accident frequency on the foreman's record or cost, production, etc. Others may be appealed to through their sense of responsibility. Man is vain. Therefore, when you place responsibility on him it also appeals to his vanity. The placing of an indifferent individual on the safety committee will often win him over and convert him to the importance of plant safety.

There are many ways by which you can sell safety to your employees. It is your job and your responsibility to analyze your own cases. Don't give up the struggle, even though the perfect goal will never be reached. Accident frequency can be improved in your plant. It has been improved in many plants. It is being improved in many plants today.

As a safety director in your plant, I believe you should be interested in the safety of your employees outside the plant as well as in the plant. You should give them instruction and talk highway and home safety to the individual and to groups. This, I believe, from the humane standpoint, is as important as safety within your individual plant.

After his diagnosis of the boy, the doctor said: "I'm not sure what ails this child, but I can give him some pills that will throw him into fits, and I'm hell on fits!"

FLYERS SHOULD FIT SPINDLE TOPS PERFECTLY



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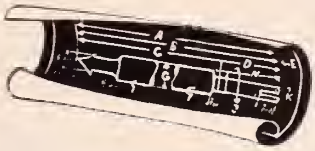

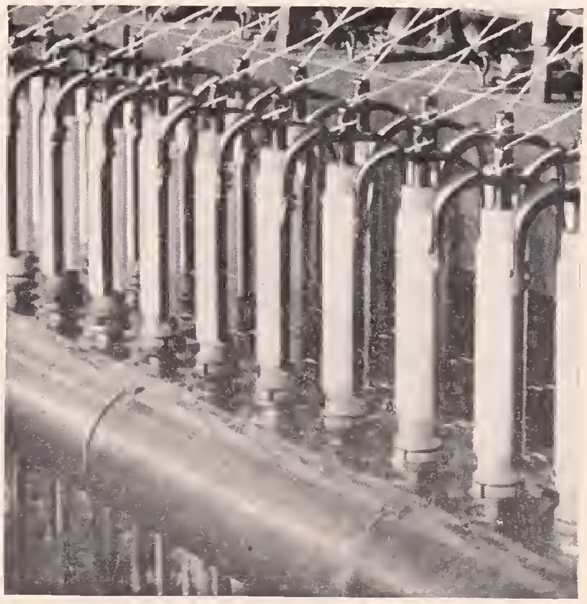

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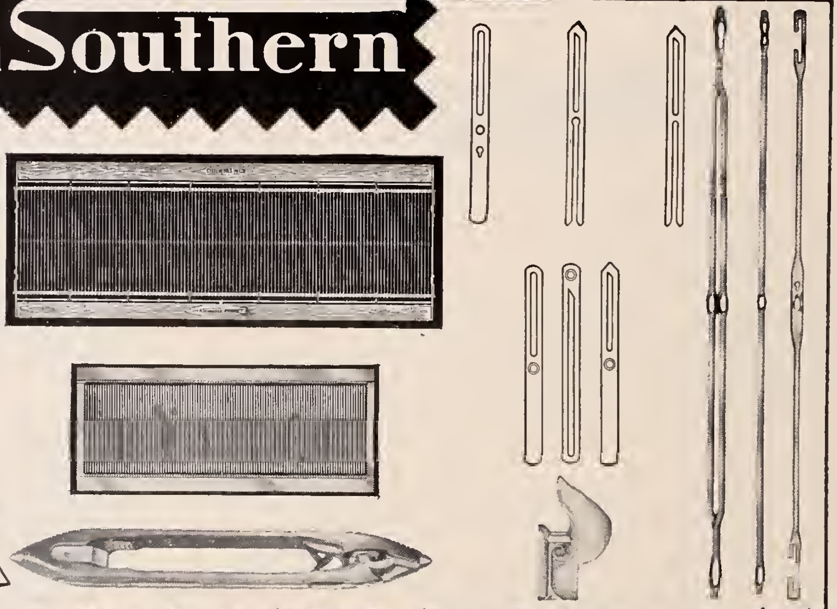

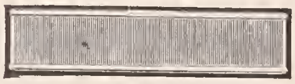

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CLEMSON HONORS THE TEXTILE INDUSTRY

By Harry Riemer
Editor of the Daily News Record, New York, N. Y.

We give thanks for industrial might,
Dedicated to uphold the right,
Symbol of defense of our nation,
Bulwark against any domination . . . .

It gives steady employment with good pay;
Improves living standards day by day;
Contributes greatly to our success;
And means content and happiness.

Textiles play an important role
In helping the nation to reach its goal;
In peace or war they are a mainstay,
With the vigor and high morale they display.

Let's all salute Clemson's honorees,
Those men who received doctor's degrees—
For everything noble in life they stand;
They represent the best in our land . . . .

Let's pay tribute to J. E. Sirrine—
His memory forever will mean
Textile growth and progress of the best,
And power to conquer any test.

The temperance committee heard of a man ninety-five years of age who had never tasted alcoholic beverage, and rushed to his bedside for a testimonial. While they were guiding his trembling hand along the dotted line, an awful commotion arose in the next room.

"What in the world is that?" asked one of the good ladies.

"Oh, that," gasped the old man as he sank back on his pillow. "That's my Dad. He's been drunk for a week."

Two girls were discussing their prospects of marriage.

"I understand your boy friend will graduate from law school next month. I suppose you'll get married then?"

"Oh no, not right away," answered the other, "I want him to practice about a year first."

A young teacher substituted for a friend who was taking a week off for a honeymoon. Some time later at a party someone started to introduce the groom to her.

"Oh, I know Miss Jones very well," he said brightly. "She substituted for my wife on our honeymoon."

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TEXTILE WINDING MACHINERY

An Englishman returned home from a trip to America, and was telling his friends about one of the queer American games he saw played at a carnival.

“It is called ‘Ohhell’ I think,” he explained.

“ ‘Ohhell?” asked his friends. “How do they play it?”

“Well, you pay a dime and you get a card. Then a man calls out a lot of numbers and after a while someone yells “Bingo.” Then everyone else yells “Ohhell”.

In golf, it’s distance.
In a cigarette, it’s taste.
In a Crosley, it’s impossible.

A little boy about to show his pet rabbit to a guest was entering the drawing room with the animal when the animal proceeded to give birth to an enormous litter of baby rabbits. The boy watched for a moment, dropped the mother rabbit to the floor, and cried, “Holy smoke, the damn thing is falling apart.”

Ohio, said to be “the mother of presidents,” seems to be pregnant again.

Ambitious young man: “Sir, I am convinced in my heart that your daughter and I were simply made for each other.”

Father: “That’s where you’re wrong, young man. At the time we had no such thought in mind.”

Major: “Why did you give that WAC a medical discharge, Doc?”

Doc: “She’s been hit by a guided muscle.”

We knew it would finally happen if he kept carrying on. Mrs. Santa Claus shot Santa when she caught him laying a doll under a Christmas tree.

From riches to rags is a much quicker trip than from rags to riches. We know a fellow who, just two years ago, had a yacht and a dozen women. Today he has only a row boat and a couple of oars.

As the elevator operator in the hospital closed the door, she called out “What floor, please?”

A soft voice from the rear answered: “Ladies Ready-to-Bear, please.”

Lulu: “Would you like to see the place where I was operated on for appendicitis?”

Luke: “No, I hate hospitals.”

As The Editor Sees It - - -

R. R. Fowler '53

The initial aim of every college student is to be a success in his field of endeavor. In order for a person to be successful and happy in his success, he must be engaged in the type of work he likes best and is most capable of doing. Perhaps the most important single step the student has to make in reaching his goal is to attain the job he likes most, and is best suited for, upon his graduation. In the case of a Textile student, his chance for securing the job of his choice may lie in the impression he makes upon the person interviewing him. Even though a student may be very capable and very well prepared in his field, the chances of his securing the job of his choice may be greatly lessened if he should leave an unfavorable impression upon the representative of his prospective employers.

The editor, with the very able assistance of Mr. E. E. Waite, Professor of Psychology at Clemson, has compiled a number of outstanding points which should be considered by the student before appearing for a job interview.

Initially, a student should strive to make a good general impression on the interviewer. In order to enhance his personal appearance, the student should wear a conservative suit, a white shirt, and an appropriate necktie to the interview. His clothes should be clean and neatly pressed. His shoes should be well shined. He should have a fresh haircut and a clean shave. In short, the student's overall appearance should be pleasing to the individual.

After a formal handshake with the interviewer, the student should allow the representative to open the discussion. The student should answer all questions readily and politely. A confident attitude, without any display of cockiness, should be maintained by the student throughout the discussion. It is a custom of many job interviewers to induce the student to talk about himself. The interviewer often asks the student to render a brief summary of his life. If asked to do this, the student should speak openly and truthfully, and always in his best manner. He should neither be boastful nor overly shy or modest. It is the duty of the interviewer to appraise each student he contacts for a certain type job, and to decide whether the student would be a good or bad risk for his company.

If the student is genuinely interested in a particular company, he should reveal his interest in that company by bringing forth his knowledge of that company or by asking intelligent questions as to the interests and scope of the organization.

Students who have been connected with or engaged in any extra-curricular activities should reveal these interests, but should be careful not to try to over-emphasize his abilities at these activities.

Lastly, the student who has successfully completed his numerous interviews and has been approached by more than one organization with an offer for employment, should make a wise and careful choice of these offers. In doing so, the student can help himself and the company who employs him.

Now That You Mention It . . .

. . . . the reason most people know very little about what's going on in the world is that this information isn't included in the comic strips.

. . . . there aren't nearly enough crutches in the world for all the lame excuses.

. . . . the advantage of having a large vocabulary is that you can reject the big words and choose those you can spell.

. . . . you can say anything you want to in Russia—once!

. . . . tomorrow is one of the greatest labor-saving devices known.

. . . . with modern woman putting up such a false front, a man never knows what he's up against.

. . . . by the time you can afford to lose a golf ball, most of us can't hit it that far.

. . . . a feminine woman will **never** be out of style.

. . . . nothing grieves a student more than to study the wrong lesson and learn something that he wasn't required to learn.

. . . . it's impossible for a woman to be married to the same man for 40 years. After the first twenty, he's not the same man.

. . . . a tree is an object that will stand in one place for years, then suddenly jump in front of a lady driver.

. . . . even a live wire needs good connections.

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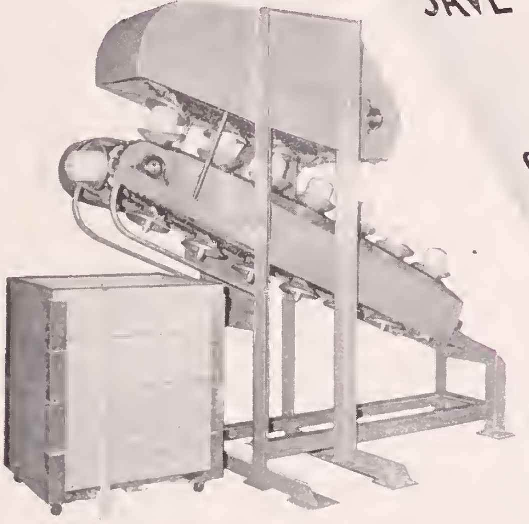

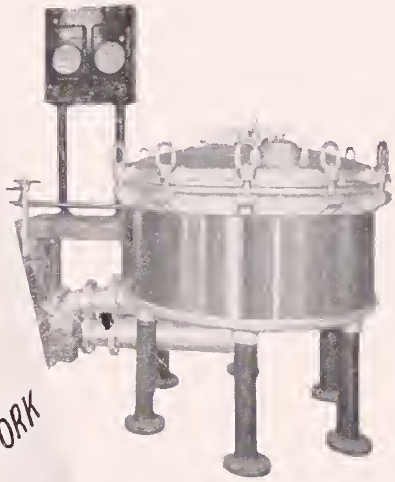

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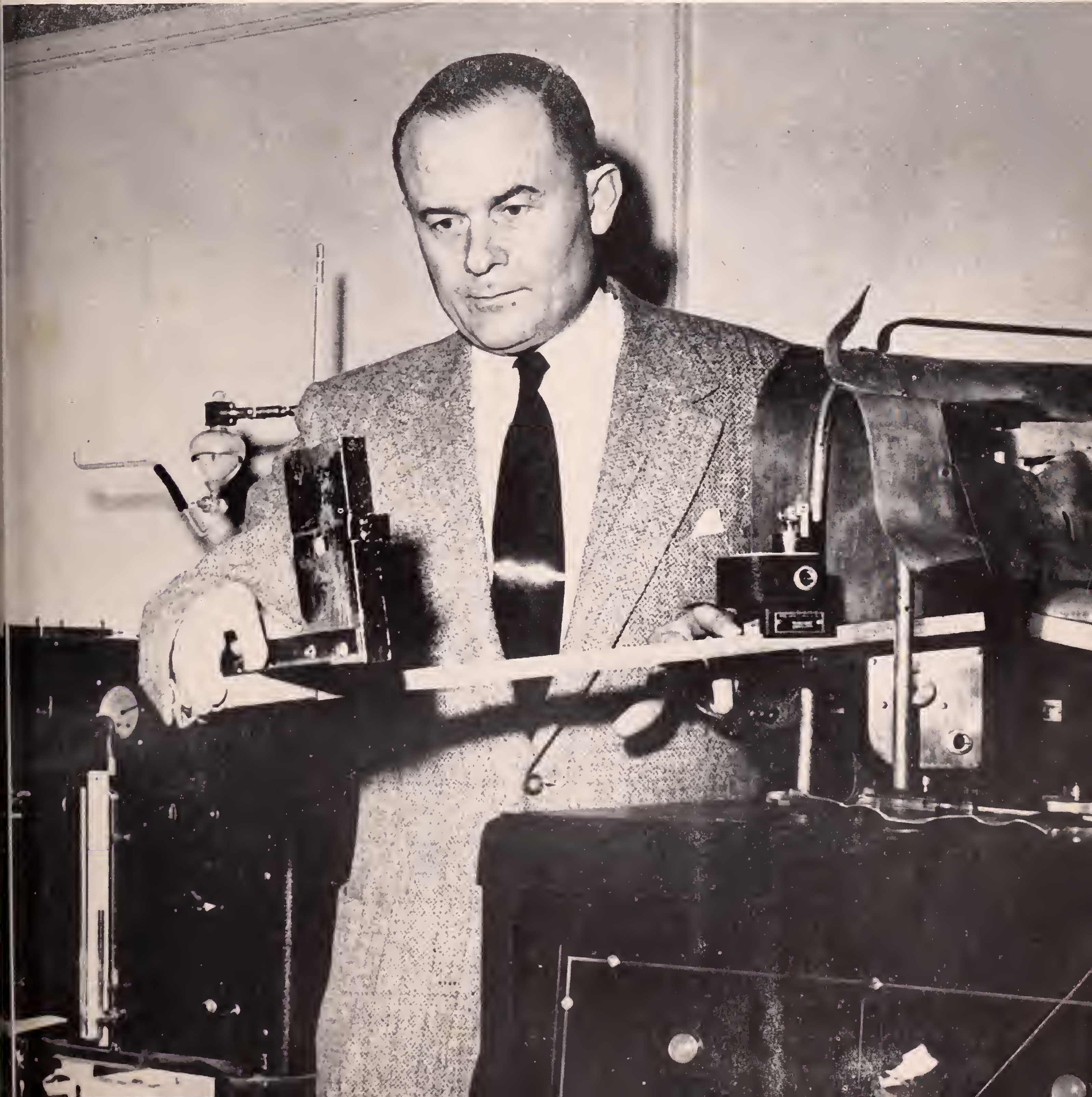
No. 1 WINTER ISSUE ☆ 1952-1953 Vol. 11



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THE
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Official Student Publication
Clemson Textile School

VOL. 11 WINTER 1952-1953 NO. 1

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THE COVER

Dr. A. N. J. Heyn is shown making adjustments on the X-Ray equipment which he uses in fiber research.

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Doing It Better

DR. HUGH M. BROWN
Dean of Textiles

A slogan in the U.S.D.A. Laboratory at Clemson reads, "The Fun of Living is in Attempting to Do Something Better." This slogan applies so well to things we are trying to do in the Textile School. We have developed nearly a score of devices for improving testing methods and processing machinery. We try to get the spirit and thrill of this work over to the students.

The textile industry offers so many challenges to do things better. A large number of problems are recognized and engage researchers efforts the world over. A few of the needed improvements are the following: a better opener for cotton; more even picker laps; better carding; an evenning device for sliver and roving; improved drafting methods; higher speed looms; radically better ways of putting in filling, probably eliminating the use of the shuttle; better tension controls on slashers, looms and tricot machines.

In the testing field we need better lap meters, nep counting methods, better meters for measuring fiber length, strength, fineness and maturity.

There is a continuous search for more and better automatic controls for an ever greater number of textile processes.

At Clemson we are working on, or plan to work on, all of the above problems for the good of the industry, for better training of our students and for "fun of living."

CLEMSON PROFESSOR RETURNS

Mr. Evans A. LaRoche, Assistant Professor of Weaving has returned to Clemson after an absence of more than 2 years. Professor LaRoche left Clemson in September 1950 to do graduate work at the Georgia Institute of Technology, and received his M.S. in Textile Engineering in June, 1951.

Shortly after graduation from the Georgia Institute, he was recalled to active duty by the Army as 1st Lieutenant, Infantry, and assigned to the 82nd Airborne Division at Fort Bragg, N. C. Overseas orders were soon received and after a 30 day refresher course at the Infantry School, Fort Benning, Ga., and a 30 day leave, the lieutenant was on his way to the Far East.

Upon reaching Japan in early February 1952, Lieutenant LaRoche was assigned to the Far East Command Intelligence School for a 10 week course. In April, he attended a Clemson Alumni meeting held in Tokyo where he met Major and Mrs. Coakley (formerly at Clemson) and several other Clemson men. Upon completion of the course, he was assigned to the 3rd Infantry (Rock of the Marne) Division, and proceeded to Korea to join his unit in early May, 1952.

In Korea, Lt. LaRoche served with the 1st Battalion, 65th Infantry Regiment (Puerto Ricans) of the 3rd Division as a rifle platoon leader in Company B and as 1st Battalion Intelligence Officer. He left Korea in October 1952, and was separated from the service on November 8, 1952.

Since his return to Clemson, Professor LaRoche has been engaged in research work under the direction of Dr. H. M. Brown, Dean of the School of Textiles.

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Industry's Part In Textile Undergraduate Education

The following is the speech presented by N. M. Mitchell, President, Barnes Textile Associates Inc., Boston, at the National Council of Textile School Deans Meetings in Boston on November 11, 1952.

The Textile Industry in the United States is reflecting the greatest advances of its entire history. A wide range of new inventions have brought about many revolutionary changes in manufacturing procedures. Engineered technological changes in methods are being successfully inaugurated throughout the industry. Newly developed synthetic commodities are being processed in place of cotton, silk and wool, with no seeming limitation to further developments in this direction. Labor management relations have undergone drastic changes and are still in continual flux, especially where organized labor is involved.

What is happening in the field of education for those interested in the textile industry? Are the rank and file of educators following the old procedures and curriculums? Are those serving as instructors keeping themselves abreast of the times in all of the various divisions of activities common to the textile industry?

Because of my having been found somewhat outspoken in regard to present day Textile College undergraduate education I was asked to elaborate on my opinions at the 1946 Fall meeting of the American Society of Mechanical Engineers held in this hotel (Hotel Statler). The meeting was attended by several Presidents and Deans of Textile Colleges and there were many undergraduates in attendance as well. While many of the educators present did not agree with all I had to say, they were obviously sympathetic to many of the points I brought out. There was also a general agreement that there was a great need for revision and improvement in textile education procedures but it was seemingly difficult to arrive at any mutually acceptable program to develop the needed changes.

Following my now being asked to again talk on this subject, I decided to re-read the paper which I had prepared for the October 1946 meeting in order to compare my curent thinking with my earlier expressions. In doing this I found practically all I had presented to be equally applicable today. I am referring to many of these points in this discussion.

In considering the subject of education and its use I quoted a statement which I think applies very directly to our subjest, namely, "Truth is revealed. It needs only to be practiced." In a sense this is the philosophy which underlies all forms of education. It expresses the feeling of interdependence which exists between qualified teachers and students, in this instance between the textile college and its faculty, and the students and their careers.

I also made reference to a statement attributed to Edward Gibbons, "Education is a harmonious development of all of our faculties. It begins in the nursery and goes on at school, but does not end there. It goes through life whether we will or not. Every person has two educations, one which he receives from others and one more important, which he gives himself."

The interdependence of the educator and the student as I see it, is a reflection of the confidence which each has with the other. A leader, or instructor must not only know what he is talking about, but he must know how to pass his knowledge on to others. Both elements are equally important. In considering this angle of current conditions, the question can be asked, are present day courses of instruction built around commodities, machinery and methods commonly used in the various branches of the textile industry today? If these are answered in the negative, steps must be taken to correct the deficiencies.

In considering the subject of textile college education it would be interesting to note and analyze the answers to the following questions.

1. What does the student hope to achieve as a result of his successful graduation from the textile college he selects?
2. What does the college faculty set as it goal in planning and supervising the students education?
3. What type or form of education does the textile executive consider will best equip college graduates to properly qualify themselves for service in the industry?
4. Do the rank and file of mill executives want graduates who have specialized or do they consider a general all around education as best?
5. If the latter is desired, what does the classification "general" embrace?

These and many other questions can be asked in the interest of clarifying the thinking of college faculties, student and those who hire the graduates for replacement in the industry.

My own opinions in regard to the subject of textile education are based on experience as a practical mill executive combined with that obtained from several years as a practicing consulting engineer. Over this range of experience I have been active in selecting, placing and helping to train many young men, with and without college educations. My review of these experiences, unfortunately, does not summarize to the fullest credit of the textile college graduates to the extent which should be anticipated. The opinion is formed however that a much fuller realization of anticipations could be attained if the college curriculums were to be regularly adjusted to meet the progressive changes which are always taking place in the industry.

The textile industry embraces the processing of several different basic raw materials. The major divisions in the industry are:

1. Cotton
2. Wool
3. Silk
4. Jute, flax and other grass fibres.

The advent of synthetic fibres has actually revolutioned the industry and brought about consolidations of all fibres into integrated units of production. The college faculties, students and mill executives must give first consideration to all of these divisions of activity.

Each of the indicated commodity divisions are further divided into two general classifications, namely,

1. Manufacturing, and
2. Selling or distribution.

Here again these divisions must be recognized by faculty, student and mill executive.

The division of manufacturing, from an education standpoint, either general or selective must be divided into still finer classifications. Manufacturing operations embrace:

1. Administration
2. Finance
3. Accounting
4. Production engineering
5. Personnel engineering
6. Chemical or physical laboratory engineering
7. Mechanical engineering,

and many other equally important and distinctive divisions of work.

Selling or distribution must also be broken into many channels which call for specialized consideration, especially from the standpoint of education.

On the basis of the premise that textile college education must cover all of the indicated phases of manufacturing and selling it is obvious that the development of a curriculum of this scope will call for close collaboration between the textile colleges and the textile industry as a whole. In view of the fact that the textile manufacturer has the greatest stake in the project of the undergraduate training, he should and unquestionably would assist the colleges in every way possible.

As I stated in my earlier talk on this subject, I feel confident that it would be possible to organize a group representative of the best executives and engineering minds in the textile industry to work with instructors selected from the faculties of the textile colleges in the redevelopment of present courses of study, modernizing them to meet current requirements.

I firmly believe that the only possible way these needed changes in educational methods can be developed is through the courageous unified action of small groups who are intelligently and sincerely interested in such a program.

The textile industry seemingly demands broader and more complex schooling of personnel than do other industries. For that particular reason a textile college graduate often receives an education which is limited to fundamentals in a large number of processes and divisions of industrial activity.

Again, as I indicated in my first paper, the record clearly points out the fact that the textile colleges throughout the country have graduated a large number of men into the industry. A large percentage of the country's most able textile executives and technicians are textile college graduates, but it is also generally recognized in the industry by both non-graduates and graduates of textile colleges, that more specific treatment of undergraduate education has become necessary in order to meet the drastic changes which are taking place in industrial activity.

As stated, a surprisingly large number of textile college graduates have stuck to the industry, but a brief survey has disclosed the fact that there are but a relatively small number who are now engaged in work which is directly associated with the subjects studied.

Today, as before, I am hopeful that this treatment of the subject and the discussions which will follow,

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FIBER RESEARCH AT CLEMSON

By R. R. Fowler, TM '53

Dr. Heyn has been a professor of Natural and Synthetic Fibers for about five years at Clemson College in the School of Textiles. He was educated in Holland and received his Ph.D., from the University of Utrecht; he also studied at the Technical University in Delft, Holland. After receiving his Ph.D., he continued his studies with a fellowship of the Rockefeller Foundation in Paris (Sorbonne and other institutions), and in the Textile Physics Laboratory of the University of Leeds, England. From 1936, he was in charge of fiber textile research for the Netherlands Government in the Dutch East Indies. After the war he was sent on a scientific mission to several countries, including England, Australia and the United States. After this mission was completed he accepted his present position at Clemson College.

The textile field in which Dr. Heyn has specialized may be called "**Fiber Science**" and covers the production, preparation, properties, utilization and economy of both natural and synthetic fibers. With regard to the natural fibers this includes the agriculture and botany of the plants producing the fibers, the preparation of the fiber from the plant and with regard to the synthetic fibers and their manufacturing processes.

The study of fibers has many facets and can be approached from chemical, physical, botanical, microbiological, and many other angles. All these various aspects are discussed in the fiber courses given by Dr. Heyn and are represented by the lines of research in his laboratory. Some of these lines will be briefly mentioned here.

In the field of **Physical research**, one of the branches that Dr. Heyn has specialized in is the study of fibers by **X-ray diffraction.** This method gives information about the molecular structure of the fiber; namely, the type of molecules which compose the fiber and their arrangement of configuration in the fiber. This molecular structure is the basis of most of the physical properties of the fiber. When he started his work at Clemson the Kress Foundation furnished the funds for the purchase of an X-ray apparatus.

Two lines of research has been followed since; one, a systematic comparative study has been made of x-ray diffraction patterns of all natural and synthetic fibers. The results have been published in various articles and have been summarized for the synthetic fibers in a chapter on x-ray diffraction in **The American Handbook of Synthetic Fibers** which has just appeared, and for the natural fibers (together with synthetic fibers) in a chapter on this subject which will appear in the new 6th edition of the well known **Handbook of Textile Fibers by Mathews** which is now in press. This first line of x-ray research was carried out with the conventional technique giving information about the **molecular** structure.

The second line of x-ray research which was followed by Dr. Heyn has been the study of the scattering of x-rays at very small angles by textile fibers. This new method has been developed by him in Clemson College and proved extremely useful for the study of the microcrystallites or "micelles." Four publications appeared on this subject. The method has been very much refined recently by the introduction of the use of a Geiger counter and a special microdensitometer for more exact measurements of the scattered radiation. The Kress foundation again enabled the purchase of these instruments. With these instruments a systematic study of the small angle scattering by all different textile fibers is in progress.

In the field of **Chemical** research his work in Clemson has been concerned with the waxes of various vegetable fibers. It was found for the first time that the percentage of wax in cotton is not constant but depends on the maturity of the fiber. The results were published in two articles.

In the field of **Biochemistry** and **Microbiology** he recently published an extensive treatise on the retting process of hard fibers which deals with bacteriological decomposition of plant cell walls as a result of which the fibers are separated from the other tissue of the plant so that they can easily be extracted. This book was published in the transactions of the Royal Netherlands Academy of Science and discusses the results of some of his former work in the present Indonesia. The School of Textiles and the Kress Foundation gave a grant enabling the reproduction of a series of photomicrographs of the different bacteria involved for illustration of this publication.

The **Microscopy** of fibers is another subject. Dr. Heyn originally organized the Microscopy course which is now given by Assistant Professor J. C. Edwards. As there has been a serious need for a modern text book, Dr. Heyn recently has written a text on **Fiber Microscopy, a Textbook and Laboratory Manual** which is now in press. It includes the micro-

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The Textile Industry in Pakistan

By Rafique Saigol

One of the many reasons why the Moslem minority in pre-partioned India strove so feverishly to achieve independence was that they sought economic freedom from the moneyed Hindu clique that had, with encouragement from the British, monopolized every phase of business activity, except that which required actual manual labor — that was left to the Moslems. This is not a passionate plea for support, not an emotionally partisan viewpoint, but a cold, stark fact stated so that what follows will be better understood.

Once independence had become a reality after August 14, 1947, the Government of Pakistan was faced with three crucial problems, which stated in order of their importance were: Organization of the economic and political structure of the country; rehabilitation of the more than 8,000,000 stricken Moslem refugees, recently arrived from India to make Pakistan their homeland; and the gradual education of the only 13% literate population. Since, these five years have told a story of a people willing to work, of ceaseless effort and of unfaltering faith in themselves and in their leaders.

The people of Pakistan started off with a Homeland rich in potentiality but almost destitute of modern industry and lacking in trained personnel and skilled technicians. Of the great strides the subcontinent had made in a hundred years, Pakistan at Partition gained almost nothing. The great industries that India had developed were concentrated around Bombay and Calcutta and in the hinterland of these ports. The cotton grown in West Pakistan was spun in the mills of Bombay, and the jute grown in East Pakistan was processed in the jute mills of Calcutta.

Things are very different today. In East and West Pakistan the industries vital for her existence are already beginning to hum with activity, to rear against the sky-line in massive piles, and to galvanize with the transfusion of new blood, the muffled heart-beats of her industrial life.

In the textile industry the immediate progress is easy to record since the relative units are smaller, more compact and less tied up with ultimate long-term plans.

Jute: It had always been realized that the country should be able to put its "golden fiber" to industrial use in the shortest possible time. Out of this concept has emerged the Adamji Jute Mill in East Pakistan which stands foremost in the field where Government and private enterprise have joined hands. Three more mills, with 3000 looms in all at an estimated cost of 75 million rupees, are now being set up. The installation of the entire 1000 looms of the first mill have been completed and 500 looms have already gone into production. The entire project will be in operation by June 1953.

It is expected that another jute mill, in which the Government will again participate, will be set up shortly near Chalna in East Pakistan.

Cotton: The progress in the sphere of cotton textile industries has been most noteworthy. The original target of one million spindles fixed for the first five years by the First Industries Conference has subsequently been raised to 1.35 million spindles on the recommendation of the Textile Advisory Committee. Of this number 1,177,120 spindles have already been allocated and the bulk of the balance is expected to

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Eccentric Drive Gearing May Improve Loom Performance

By Dr. Hugh M. Brown, Dean

The School of Textiles, Clemson Agricultural College, Clemson, S. C., has been experimenting for several months on the use of off-center gears for loom drives. The idea is to allot a greater part of the time of a crankshaft cycle to the movement from top center to bottom center than is allotted to movement from bottom center to top center.

In a standard loom drive the eccentricity of the lay and the design of the cam permit a slightly greater time for picking than for beating. The Clemson design maintains these features and, in addition, the use of eccentric gears greatly increases the percentage of the cycle for picking.

At Clemson the shafts of the crankshaft drive gears were moved just 8% off from center (about .4 in.), and this slight change allows 56% of the cycle for picking and 44% for beating-up. This relationship can be changed much more by increasing the eccentricity of the gears.

By giving a greater proportion of the time in a cycle to picking, the speed of the loom can be increased without the troubles usually encountered. For example, if a loom is now being run at 160 ppm, it can be speeded up to about 180 ppm, by the use of eccentric gears, without reducing the time allowed for picking. And it is this time allowed for the travel of the shuttle from box to box which largely determines the top operating speed of a loom, according to Clemson textile school officials.

The eccentric gearing arrangement, as installed on a loom at Clemson, permits an increase of about 12% in the speed of the loom without increasing the shuttle. Picking time is not reduced; it is the beating-up part of the cycle which has been speeded so as allow an increase in loom speed.

On the other hand, if these gears are used and the loom speed is kept the same, picking time is increased and the power required by the picker can be reduced proportionately.

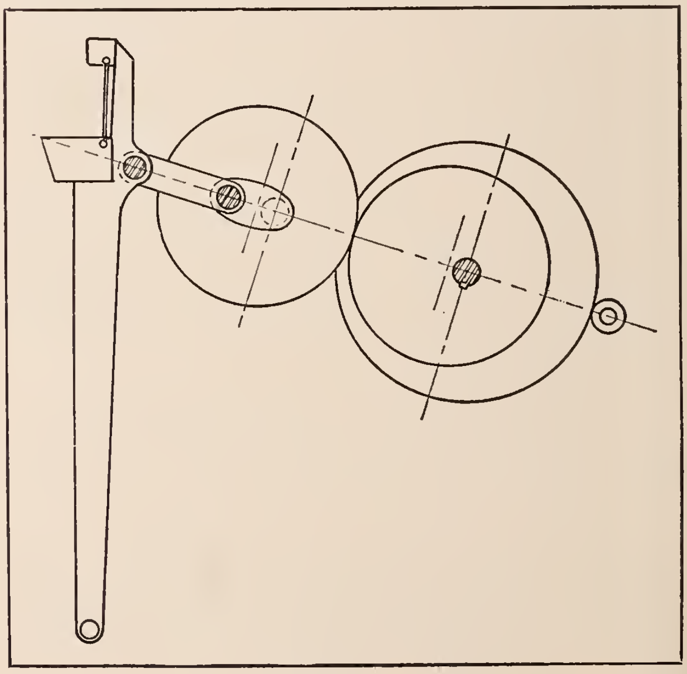
While no mill tests have been made, results of the experiments in the laboratory indicate that eccentric gears make possible an increasing power to the picker and without any increase in maintenance.

The following article was originated by Dr. Hugh M. Brown, Dean of Textiles at Clemson, and appeared in the October issue of Textile Industries Magazine.

There are still several points to be investigated. What effect will this type of drive have on the warp breakage? Will there be an increase or a decrease in loom vibration? These questions will be answered definitely only by mill testing, but indications are that results should be favorable.

Clemson is making plans to market, through some commercial organization, a kit which would supply all the parts needed to change any cam loom to this type of drive. It would include the two eccentric gears, a jack shaft and bearings, an extension for the motor, and two pick cams. The new drive could be installed in a few hours.

ECCENTRIC DRIVE arrangement between motor pinion and lay crank.



A Review of the Knitting Industry

By T. D. Efland

Assistant Professor of Knitting

Probably no one phase of the textile industry is as little appreciated by the average textile student as the field of knitting. While confronted on every hand by important contributions to human wearing apparel from the knitting machine, a majority are ignorant of the vast industry and highly technical processes that make possible knit garments. Knitting is a modern and progressive phase of the textile industry and one that is making new gains each year in the clothing market. It is a field that invites the attention of the young and adaptable mind which has been trained in the technical aspects of the textile industry.

The Knitting industry represents by employment approximately one-fifth of the U. S. textile industry with about one-quarter million of the nations' one and one quarter million textile workers. These workers are distributed among 3,000 plants ranging in size from those with less than a dozen employees to those which are manned by many hundreds of workers. Although there are many large plants in the industry, the competitive spirit of the Knitting industry derives from the high ratio of small producers. With but few exceptions the minimum economical operating unit is very low for Knit products.

Knit fabrics, while relatively new compared to the history of textiles, have been used for most items in wearing apparel. From the first conception of the knitted stitch some five hundred years ago it has been universally recognized that Hosiery could possess desirable qualities only by being knit. Thus the largest segment of the industry is devoted to the production of hosiery. More recently the trend to knit underwear has caused a growth of plants for their exclusive production. The fit, comfort, and serviceability of knit garments is giving rise to the increased use by every segment of the population with the trend being more pronounced in the infant's and children's field.

The advent of the high-speed tricot machine has caused a major change in the apparel for women in the present decade. The inherent qualities of tricot cloth combined with the qualities of acetate and nylon yarn have captured a majority of the lingerie field. Tricot production to date has hardly been sufficient to supply the lingerie market and consequently has had little opportunity to expand into other fields of apparel.

The latest survey shows 137 mills in the country operating 3,000 tricot machines. Of this number forty-four mills with 1,300 machines are located in the South East. Three of the newest and largest of these plants are in South Carolina. With the demand for tricot fabrics continuing to rise, most of the major Textile concerns have plans underway for tricot plants. The rate of growth in tricot has only been exceeded by that of the synthetic fiber industry in the postwar period and indications are that it will continue to boom for some time yet. This indication arises from the fact that a majority of tricot production to date has been plain Jersey fabric leaving an unlimited range of thousands of fabrics yet to be produced by the knitter and exploited by the designers.

An idea can be had of the size of the hosiery industry from the production figures for 1951. These figures show that approximately 617 seamless mills and 738 full-fashioned mills produced 103 million pairs of seamless hosiery for a total of 154 million dozen pair. This represents approximately one dozen pair for every man, woman, and child in the United States. It is interesting to note that the South produces 79.4% of all the seamless hosiery and 57.4% of full-fashioned hosiery made in this country. The increase in production in the South has risen steadily for the past decade and at present there is no end in sight.

The Knitting industry is characterized throughout by a high productivity per operator. The productivity arises from the high speed of the machines and the inherent qualities of knitted fabric. It has often been said that knitting is the cheapest way of converting yarn into fabric. Certainly the speed of the machines makes this true. There are knitting machines in production which will produce more than one hundred square yards of fabric per hour. With one operator to care for several machines the production per man hour is very high.

LINTHOUSE PERSONALITIES

By R. F. Compton, TM '54

PROFESSOR JOSEPH LINDSAY, JR.

Mr. Lindsay was born in Chester, South Carolina. He attended Chester High School, graduating in 1915. He then attended Erskine College where he played football with Dode Phillips. After his graduation in 1919 he returned to Erskine as coach. His best remembered football game was a 14 to 13 defeat of South Carolina in 1918.

Mr. Lindsay enlisted in the Army during World War I, and spent about six months in the service at college and in training at Plattsburg, New York.

He studied additional chemistry at the University of North Carolina and Chicago, later studying Textile Chemistry at Philadelphia Textile School. This was before southern colleges offered majors in this field.

Upon completion of his studies in Textile Chemistry, he worked for General Dyestuff Corporation in Charlotte as a technical trouble shooter and laboratory chief from 1926 until 1935 when he came to Clemson as head of the Textile Chemistry and Dyeing Department in 1935.

Mr. Lindsay attended summer sessions at the University of Tennessee from 1940 until 1945, receiving a Master of Science degree in 1945. During this same period, he spent half the summers as lecturer at the dyeing school for college graduates conducted by the Ciba Company in their headquarters in New York.

Mr. Lindsay is married and has one son who is a junior at Clemson. He is an Elder in the Presbyterian Church, a member of the Advisory Board of the Y.M.C.A., a national councilor for the American Association of Textile Chemistry and Colorists and is Chairman of the Student Award Committee of the A.A.T.C.

LETTER OF RECOGNITION

The following letter was received by Dr. Brown, Dean of the School of Textiles, from Mr. Hobart Souther who is Chairman of the Piedmont Section of A.A.T.C.C. The letter is very complimentary and should make all of us proud of our school.

Dear Dean Brown:

"I want to thank you very much for the wonderful hospitality extended the Piedmont Section, A.A.T.C.C., by you and your staff, students, and all our other gracious Clemson College hosts at our recent Spring Meeting at Clemson. Your welcome remarks contributed immensely to the enjoyment of the dinner meeting.

Everyone was amazed at the tremendous progress made by the Clemson School of Textiles, and in view of the fine papers presented by your students, you and Joe Lindsay, as well as Clemson College itself, can truly be proud of a most commendable contribution to the entire textile industry.

It has certainly made me feel happy to be told by so many members that our Clemson meeting was one of the finest we ever held in that section. This sentiment has led to suggestions from a large number of members to hold all our Greenville meetings at the Clemson House, which is another great compliment to Clemson College, as well as to those who joined with you in appearing on our program and contributing so much to its success."

Yours very sincerely,

Hobart Souther, Chairman
Piedmont Section, A.T.T.C.C.

DR. W. T. RAINEY, JR.

Mr. Rainey was born at Salisbury, North Carolina on September 1, 1919. He lived in Badin, North Carolina. He attended Fayetteville High School, graduating in 1935. From 1935-37 he attended Oak Ridge Military Academy, after which he attended Davidson College receiving his B.S. degree in Chemistry in 1939. After graduation, Mr. Rainey continued his study of Chemistry at the University of North Carolina Graduate School of Chemistry from 1939 until 1941. Later, he returned to Davidson College and taught Chemistry for one year. After this, he took a position as Research Chemist in the Chemical Warfare Department at the U. S. Naval Research Laboratory in Washington, D. C., where he worked from 1941-1943.

Mr. Rainey volunteered for the Navy in 1943 and received his basic training at Bainbridge, Maryland. Later, he went to Radio Technician Schools at Chicago, and from there to Del Monte, California and Treasure Island, California, where he served as an Instructor at the Radio Technician School. He was discharged in 1946 with the rank of Radio Technician Second Class.

After receiving his discharge, he returned to the University of North Carolina, receiving his Ph.D., in Chemistry in June 1949.

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Where Are They Now?

By R. R. Fowler, TM '53

Upon their graduation in February, thirty-one Clemson textile graduates will go into the textile world to pursue their ambitions in the field they have chosen. These new graduates are not likely to be among complete strangers, as they will probably meet old friends and classmates in any of the various textile concerns throughout the industry.

In the following paragraphs are listed a few Clemson graduates and the positions they now hold in the textile industry.

Now employed by Abney Mills are:

Carl W. Seigler '43, Assistant General Manager of the Anderson, Belton and Courtenay plants; Joe L. Burriss '29, Master Mechanic, Anderson plant; Keith Buchanan '49, Quality Control and Standards Department, Anderson plant; Ryan D. Mitchell '29, Night Overseer of Weaving, Belton plant; Luther B. Rentz '47, Recreation Director, Belton plant; Robert S. Davis '51, Supply Department Head, Brandon Mill; Claude D. Nalley '33, Superintendent, Poinsett Mill; James M. Cathcart, Jr., '32, Office Manager, and Miles Moss, '49, Paymaster and Shipping Clerk, Courtenay plant, Newry, S. C. Also E. W. Seigler, Sr., '49, Assistant to Vice President in charge of Production, Greenwood; Jesse Boyce, '46, Assistant Superintendent, Panola plant, Greenwood; Richard Hendrix '49, Assistant Card Room Overseer, and Brooks Patterson, '49, Quality Control and Standards Department, Woodruff.

Former graduates with the Dunean Group of J. P. Stevens and Company in Greenville are:

Allen Adams '45, Designer; W. S. Armstrong (2 years at Clemson), Planning Department; Furman Bobo '39, General Overseer Planning Departments; A. S. Dargan '49, Assistant Engineer; B. A. Fletcher, '41, Assistant Divisional Supervisor, Wage and Rate Department; Harris Ford '35, Assistant Engineer; W. H. Frick '49, Supervisor Waste Control, Dunean Group; J. L. Gabrels '48, Assistant Engineer; John P. Garrett, Jr., '49, Rate Checker; J. W. Greene, '27, Master Mechanic; I. H. Grimball, Jr., '40, Divisional Cost Supervisor; Joel Earl Hudson, Jr., '48, Spun Rayon Planning; Harry Burn Iler, Jr., '48, Spun Rayon Planning; B. H. Keitt, '39, Quality Control; David Lee '46, Plant Supervisor Wage and Rate Department; B. A. Leppard, '43, Assistant Engineer; Herbert Lindsay, '45, Assistant Divisional Supervisor, Wage and Rate Department; R. F. McNab, '44, Assistant Engineer; Richard M. Montgomery, Jr., '52, Technician; Dan Moyd, '50, Overhauler, Weaving; J. B. Rhame, '47, Planning Department; James Rochester, '51, Technician; William B. Rogers, '48, Laboratory Supervisor; R. E. Shaw, '51, Slasher Tender; William S. Vincent, '48, Yarn Procurement; Charles H. Van Hollen, Jr., '42, Pilot; and Charles D. Willard, '49, Assistant Instrument Man.

With the Dunean Group in other plants are:

T. E. Eskew, '49, Assistant Divisional Supervisor, Wage and Rate Department, Whitmire; William H. Masters, '52, Trainee, Easley plant; Charles L. Rogers, '52, Planning Clerk, Williamston; and W. H. Trammell, Jr., '33, Director of Engineering, Piedmont.

With the Columbia Division of Pacific Mills are:

John T. Wingard, '36, Superintendent Richland plant; Robert G. Sharp, '40, Overseer of Weaving; Francis M. Cureton, '50, Second Hand Weaving; Robert M. Shealy, '51, Laboratory; and James R. Inabinet, '49, Production.

Also employed by Pacific Mills, but now on military leave are:

W. R. Martin, '47, Second Hand Weaving; John B. Lowman, Jr., '47, Second Hand Weaving; and Rudolph Yobs, '50, Apprentice.

The folowing men are employed by Drayton Mills, Spartanburg:

G. G. Simmons, '26, General Manager; J. L. Caldwell, '31, Assistant to Superintendent; M. B. Self, '34, Training Director; J. G. Farrell, '21, Cost Accountant; William K. Lee, '42, Master Mechanic; Carl R. Rogers, '50, Supervisor; Blynn E. Scott, '39, Twister Fixer; and James E. Sammons, 3 years to 1943, Trainee.

With Drayton Mills, on leave for military service are William Bolt, '49, Trainee, and J. W. Lambert, Jr., '52, Trainee.

With Kendall Mills in Newberry is Quay H. Fellers, '50, Assistant Overseer of Weaving.

Clemson graduates with Calhoun Mills, F. W. Poe Manufacturing Division in Greenville are:

James H. Godfrey, '42, Assistant Superintendent; Frank Chalmers, '48, Assistant Overseer of Spinning; J. Albert Edwards, '41, Traffic Department, and James F. Hann, '52, Loom Fixer. At the Calhoun Falls plant are:

Roy B. Toms, '47, Assistant Overseer of Carding; J. P. Parnell, '51, Apprentice, Weaving; Woodford Quinn, '48, Assistant Overseer of Weaving; and J. Willis Hastings, '50, Engineering Deparment.

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INDUSTRY'S PART IN TEXTILE EDUCATION

(continued from page seven)

may stimulate the interest of management throughout the textile industry and of the several textile college faculties to organize themselves together objectively to develop improvements in present day methods of education.

Constructive criticism of the present status of textile education of a necessity must include a reasonably complete and practical plan for developing the desired corrections or improvements. The following suggestions are being offered for consideration:

1. Arrange for conferences between top management groups in the industry and policy making faculty members from individual textile colleges.

These conferences will serve as a medium for the establishment of policies and the allocation of selected key men in the industry to work with various faculty members in the redesigning of courses of study to embrace present day methods, etc.

2. The conferences are to serve all textile colleges by arranging for sectional meetings at each interested college and all benefits are to be shared through the exchange of records of the various meetings.

3. Following the development of specific courses of study, textbooks are to be prepared by the same group or others as desired.

4. Key men actively engaged in manufacturing activities in the mills will be selected to serve with faculty members as associate instructors.

5. One of the most important steps to consider in this program will be the remuneration or salaries to be paid faculty members in the textile colleges. Every effort possible should be exercised in selecting the highest type of instructors. Salaries paid should be not lower than the average superintendent level in the textile industry.

6. Opportunity must be provided for faculty members to spend sufficient time periodically in specific industrial activities to permit their becoming thoroughly familiar with modernized methods.

Sabbatical years should be arranged for the faculty for this purpose.

Again, as suggested in the 1946 conference, I believe much can be gained by:

1. Providing a means for prospective college students to obtain specific placement advice from interested textile key men before selecting their major subjects.

2. Raising the level of remuneration for graduated men employed in the industry to that prevailing in comparable industries in order to encourage students to elect textile college training.

3. Bringing all key men into closer relationship with top management so that students in training may better visualize the opportunities open to them for advancement.

4. Introducing refresher courses to keep all students in training and key men better informed on improved methods in engineering, administration and management.

The combining of forces on the part of manufacturers and educators in this manner is so broad that it is difficult to translate it into single comprehensive program. However, as an example, assume a situation where a high school graduate finds himself interested in attending a textile college, influenced because of his father, any one of his relatives, or a friend who has enjoyed activity in textiles and has been reasonably successful.

This man, after either writing to or calling at the textile college and presenting his credentials, should be advised that arrangements have been made for him to visit a selected textile mill on a certain date and discuss textiles and the many branches of activity with certain mill men specified for such a conference.

The management of the textile mill in question would have subscribed to the plan of meeting with prospective students and have selected certain men in its own organization who were willing to contribute their services in this manner.

The prospective student would be questioned about his own desires and be told of the various major activities in the textile mill operation which he has chosen as his major topic of study. The mill representative should discuss his selection, if one has been made, and if warranted provide an opportunity for the student to talk with inside mill men in the chosen activity.

The mill's report on the young man and his adaptability, either to the activity he had selected or to whatever phase of work they felt he would be best adapted should be sent to the textile college in question.

In a second conference between the student and a member of the college faculty, an intelligent decision could then be made relative to the subjects in which the student should major.

It is reasonable to assume that if this approach were used, a larger number of students would find themselves carrying on with increased interest in the subject in which they majored, during their college years. The plan would also establish a bond between manufacturers and undergraduates in the textile colleges.

While efforts have been made to keep courses of instruction up-to-date, that is, in reasonable accord with the progressive improvements in machinery, methods, etc., in actual experience, however, graduates of textile colleges very often find current practices in the mills in which they are later employed to be quite different from those studied.

There is a definite need for bringing textbooks and general methods of education more in keeping with conditions which prevail in the industry at the present time.

It is readily appreciated that textbooks and methods of instruction cannot be changed overnight. The rearrangement of methods of teaching and the redevelopment of the subjects to be taught will not be difficult, however, because educators can readily turn to practical mill men and engineers to obtain a full routine of activities practiced in successful mills, and the new textbooks and plan of education be built around this information.

This overall plan as described, provides for modernizing the various courses of instructions and a means by which a student may intelligently select his subject of study throughout his college life, thus improving his acceptability to management after his graduation.

I am concluding my remarks with the same general remarks I used in 1946.

The expanding power of organized labor and more intelligent and keener competition makes progress mandatory in the compensatory realm of good management; for good management stems from good minds, and good minds cannot be allowed to stagnate for lack of fundamental education. The demand for progress holds a test in cooperation. Where the will exists, the textile colleges and practical men in the industry can develop and demonstrate the way for meeting the basic need for better trained minds in the graduates annually made available to the industry.

In conclusion I want to leave with you the resolve which was prepared at the conclusion of the 1946 discussions.

Be It Resolved That Engineers Serving The Textile Industry—

1. Never neglect an opportunity to assist and advise young men interested in obtaining a college education in any of the various branches of the textile industry.
2. Use their influence in the interest of placements for textile college graduates in the textile industry.
3. Endeavor to guide these graduates to activities where their specific education may have the best outlet.
4. Offer service to textile college faculties in the interest of improving and modernizing courses of study.
5. Offer services to assist instructors in class instruction activities.
6. Endeavor to influence textile management to establish sufficiently high levels of remuneration for graduates to attract students to the textile industry and to encourage them to seek for a college education in textiles.
7. Encourage the textile industry to develop methods of employment which will permit students to combine their education with actual practice in their selected courses of study.
8. Bend every effort to interest and influence top policy forming management in the textile industry, to establish scholarships in the textile colleges nearest their own plants.

FIBER RESEARCH AT CLEMSON

(continued from page eight)

scopical features and microscopic techniques for the identification of the newest synthetic fibers and descriptions of modern methods of microscopic investigation of textile fibers. Besides the elementary laboratory course it also includes material for more advanced work which will be of interest in certain phases of industrial research.

Recent research carried out in the field of microscopy by Dr. Heyn is concerned with methods in which polarized light is used; special optical characteristics as birefringence and refractive index were studied using these methods with all new synthetic fibers. The results have been published in a recent article in the **Textile Research Journal.**

Dr. Heyn has been assigned a few students to assist him in his laboratory work. This year he has been ably aided by Rudolph David and Rossie Fowler. Their present work consists of the preparation of microphotographs connected with the microscopic research of fibers, the preparation of x-ray diagrams and the measurements of density of these diagrams. Some chemical work is also on the program for which additional space has been recently arranged.

Dr. Heyn hopes to attract an increasing number of students to do research with him both on graduate and undergraduate levels.

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Obtaining Proper Labor Relations

By C. V. Wray, Assistant Professor of Textiles

A friend of mine, a successful textile mill superintendent, once said that his father asked him when he was a boy what he wanted to do when he grew up. He replied that he did not want to be a lawyer, a teacher, a mechanic, a preacher, a salesman, a psychiatrist — that he just did not know. During his years as a supervisor and later superintendent this friend said he found he had to be all these things to run his job properly.

The above is a perfect explanation of what a broad field this article would have to encompass if it were on "Textile Management"—the topic requested by the editor of Bobbin and Beaker.

In order to stay within the allotted space, I will stick to one phase — one very important phase — of Textile Management and that is "Obtaining Proper Labor Relations."

In a mill there is such a thing as getting and keeping the machinery and other equipment in proper condition. There is such a thing as using the right raw material. But to function properly a mill must get machinery, material, and manpower working together. The manpower, or human element, is the big variable of these three—one that is a constant challenge to supervision and management. To meet this challenge proper labor relations between the workers and their supervisors must exist.

Well, you may ask, how can these proper labor relations be brought about? How can the best be obtained from the workers, in terms of effort and cooperation, by supervision? The answers are manifold — so many that each can be touched on only briefly here.

The wage a worker receives is the one most important thing to him. That is why he comes to work in the first place. His pay should be in line with surrounding mill's wage for the same job. His pay in the envelope must be correct to prevent ill feeling.

A worker must be supplied with the proper stock and equipment so that he will be able to earn the wage he is physically and mentally capable of earning.

There always have been, there are now, and there always will be complaints from workers. The good supervisor wants these complaints brought directly to him — not spread among the other workers to breed unrest and grow from something small into something big. These complaints will be brought first to immediate supervision only if they are handled properly by supervision from the start.

Helpful hints in grievance handling are as follows:

Listen carefully to the worker's story. Put him completely at ease by using a friendly tone. Be patient. Do not rush the discussion. The complaint is extremely important to the worker. Treat it that way. Never let the discussion become an argument. Hold your temper by all means. Find out what really is behind the complaint. The stated reason may not be the real basis. Avoid snap judgements. If you are not sure of the facts or answer ask for time to check into the matter. Be sure to come back to the worker with a reply as soon as possible. When you give your decision tell why and how it was reached.

Start new workers out on the right foot. Help them in every way possible to fit themselves to their new jobs. Many mill companies have booklets that are given to new and old workers. These contain pertinent information for the worker and also help him to realize that he is a necessary member of a "team" helping to make a good organization better and by doing so will be helping himself at the same time.

Exercise fair dealings. Let the worker know by example that you are a man of your word, that you will back up what you say to him.

Maintain proper physical conditions such as having a mill that is clean, well lighted, well ventilated and not crowded. These things tend to promote a better worker attitude toward work and company.

Do not issue instructions unless you intend to see that they are carried out. If you do not follow up, then confidence will be lost in your position.

Let the workers see that every effort is being made to insure their safety while on the job.

Make it clear to the worker just who is his immediate boss. A man cannot work for several supervisors at one time.

Let the worker know, by proper planning, just what he is to do at all times. "Hit or miss" supervision and operations bring about "hit and miss" effort.

Do not reprimand a worker in the presence of other workers. All of us have some degree of pride.

Supervisors should show loyalty to the company.

Do not have "pets." Treat all workers and departments on an equal basis.

Supervision can be a give and take position—workers often have good suggestions. Do not ignore these.

Promote competition between workers. This often brings about closer employee cooperation with supervision, as many workers will want to do all they can to surpass their fellow workers.

Company or department athletic teams give many workers pride in their company or department. They give them a sense of "belonging" even though most workers may not actually participate but merely attend the contests.

Some mills teach workers to read and write if such is needed. This is a clear cut demonstration that the company is interested in the worker's general welfare.

A supervisor should show personal interest in the employees as individuals. Brief chats with the workers as the supervisor walks the job are effective. He should call as many as possible by their first names. Inquiries regarding loved one, hobbies, etc., are helpful. Workers appreciate visits when they are sick. Advice on personal matters is often requested of supervisors. These requests should not be treated lightly.

There is nothing new in all the above. It boils down to the fact that we need to review these things often and keep them in practice to bring about proper worker relations.

In closing—good labor relations are like any other endeavor, one must invest wisely in time, effort, and thought in order to reap desired benefits. These benefits just do not come by chance alone.

DR. W. T. RAINEY, JR.

(continued from page thirteen)

Mr. Rainey came to Clemson in October 1948. He is married and has a daughter two and one half years old.

In addition to teaching, Dr. Rainey is active in the American Chemical Society, The American Camellia Society, Sigma Zi and Kappa Sigma, social fraternity. He is also Scout-Master of the Clemson troop. His hobbies are amateur radio, raising camellias and azaleas.

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THE TEXTILE INDUSTRY IN PAKISTAN

(continued from page nine)

be allocated in the near future. There are 333,126 spindles at present in operation, including 177,418 spindles which existed at the time of Partition. It is expected that a further 254,320 spindles will go into production in the course of the current year. The total production at the end of 1951 was recorded at 85,112 bales of cloth and 48,437 bales of surplus yarn. So far as cotton cloth is concerned, Pakistan reasonably hopes to become self-sufficient within the next three or four years.

Wool: Pakistan produces about 30 million lbs. of raw wool but due to the absence of woolen textile mills most of this quantity is exported. For establishing woolen mills in Pakistan, the target in September 1949 was 13,000 spindles for the Punjab, 16,000 for Sind and Karachi, 9000 for the NWFP, and 2000 for Baluchistan. With the establishment of these spindles, the indigenous raw wool will be utilized to meet the local requirements of woolen products.

Since all this industrial development is based on the backing of the respective agricultural products, to quit now would be to tell only half the story of progress unmatched.

Jute: This is the most important cash crop of the country, and the area under cultivation is licensed and adjusted with the fluctuations in demand. The yield for the year 1950-51 was 4,452 thousand bales of 400 lbs. each, from an area of 1,250 thousand acres.

Cotton: Although cotton is grown in more than 60 countries of the world, in seven countries only is its production of any major commercial importance. Pakistan is one of these seven countries, and contributes about 6% of the total world cotton crop. As has already been seen, the domestic consumption of cotton is still very small, consequently most of it finds its way into the international market, making Pakistan the third largest exporter of cotton in the world. Exports in 1950-51 totalled 1,385,000 bales. The present production is of the order of 1.5 million bales.

About 90% of the crop is of the Upland American type. The American varieties are grown under irrigation. The bulk of the crop measures 15/16 inch in staple. However, sizable quantities of 1-1/32 inch are also available for export.

This has been a brief survey of the humble beginnings of a vital portion of industry in general. The picture it presents is of a dynamic economy, constantly on the move and moving faster and faster as the years fall away, one by one. No one claims that these years have been all that one might have wished them to be, but it has been a start.

PHI PSI NEWS

B. E. Wilson, T.E. '54

PHI PSI AWARDS HONORARY DEGREES

Three prominent South Carolinians were awarded honorary degrees by Phi Psi textile fraternity on October 7. The men chosen have been active in the educational, construction, and manufacturing aspects of textiles in the state for some time.

The three men honored were: Dr. Robert F. Poole, president of Clemson College; Charles E. Daniel, president of Daniel Construction Company of Greenville and a member of the board of Trustees of Clemson College; and Charles A. Gibson, president of Poe Manufacturing Company of Greenville and Calhoun Mills of Calhoun Falls, and also president of the South Carolina Textile Manufacturers Association.

Left to Right: C. E. Daniel, Earl Heard, Dr. R. F. Poole, Charles A. Gibson.

The degrees were conferred by Phi Psi president Earl Heard, vice-president and director of research of the West Point Manufacturing Company of Shawmutt, Ala. Mr. Heard was assisted by John T. Wigington, executive secretary of the fraternity and director of technical services for the American Cotton Manufacturers Institute at Clemson. The presentation followed a banquet given by Iota Chapter at the Clemson House.

Phi Psi was established at Philadelphia Textile Institute in 1902. It now has nine active chapters at textile schools in the East and South, and twelve alumni chapters with a combined membership of 3,000.

Eighteen members of the faculty of the Clemson School of Textiles and four others in textile work on the campus belong to the fraternity in addition to top ranking students majoring in the field of textiles.

NEW OFFICERS FOR THE N.T.M.S.

New officers for the National Manufacturing Society were elected at the first regular meeting this year. The new officers elected were Lenard Butler, President, Bryant Miller, Vice President, Jack Crumpton, Secretary, Arthur B. Hair, Treasurer, Claude B. Iller, Corresponding Secretary and Toy Gossett, Publicity Secretary.

N. T. M. S.

At the second regular meeting of N.T.M.S. we were very fortunate to have as guest speaker Mr. Clark Hubbard of the Deering Milliken Company. His talk on the varied phases of industrial engineering instruction given to the trainees of the Deering Milliken Company was both enlightening and instructive to the N.T.M.S. members.

CLARK HUBBARD

WHERE ARE THEY NOW?

(continued from page fourteen)

With Textron in Anderson are:

John Edward Chambers, '50, Air Conditioning Engineer; Jennings L. Lyons, '51, Draftsman; Robert Gregg, Jr., '50, Plant Supervisor; W. M. Asheley, '49, Assistant Superintendent, Riverside Mill; Tom McClure, '50, Methods and Standards Engineer; Sam Timms, '49, Supervisor Carding; Roderick Todd, '49, Methods and Standards Engineering; James Carroll, '50, Supervisor Trainee; Foster McConnell, '42, Supervisor Finishing Plant; James H. McConnell, '50, Supervisor Trainee; Gerald Carter, '52, Production Planning Department; Charles B. Burnett, '49, Supervisor Cloth Room; and Ralph Fowler, '52, Supervisor Weaving, Southside Plant.

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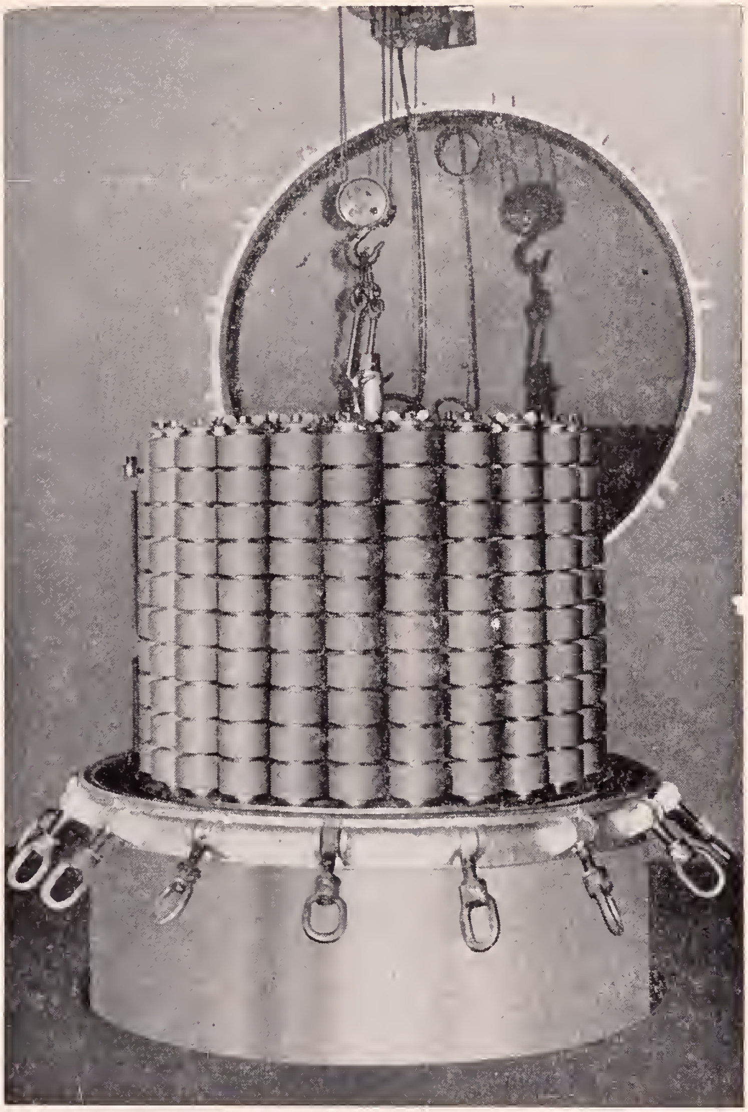

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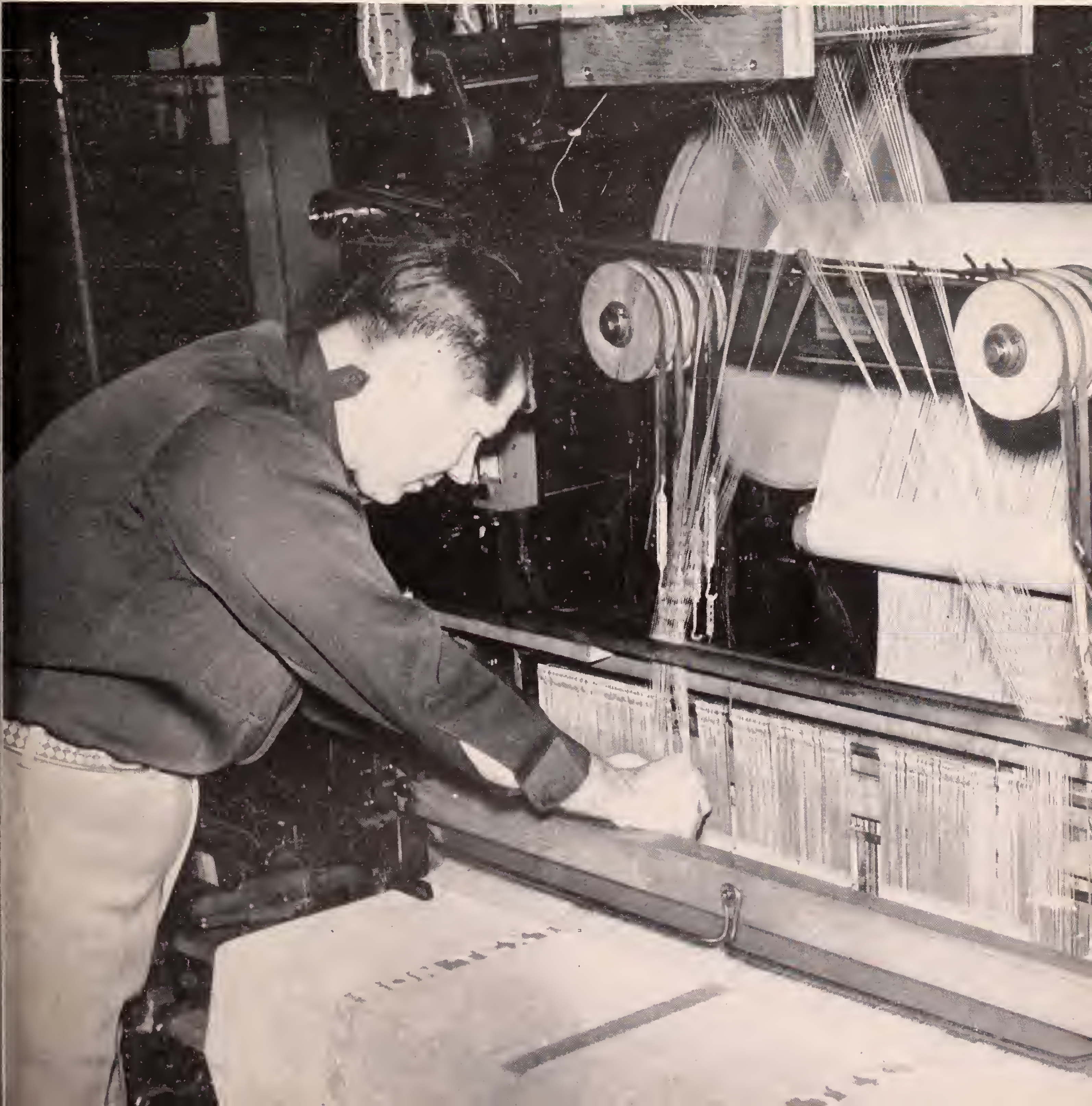
No. 2 SPRING ISSUE ☆ 1952-1953 Vol. 11



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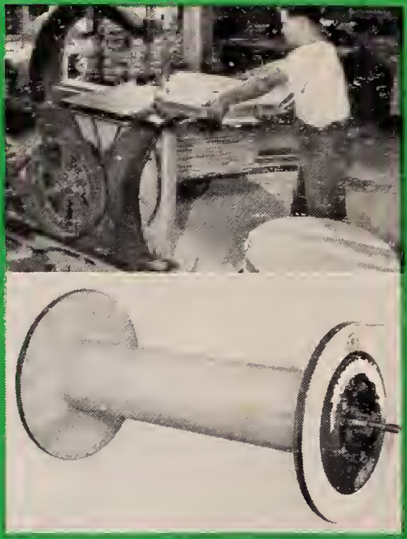

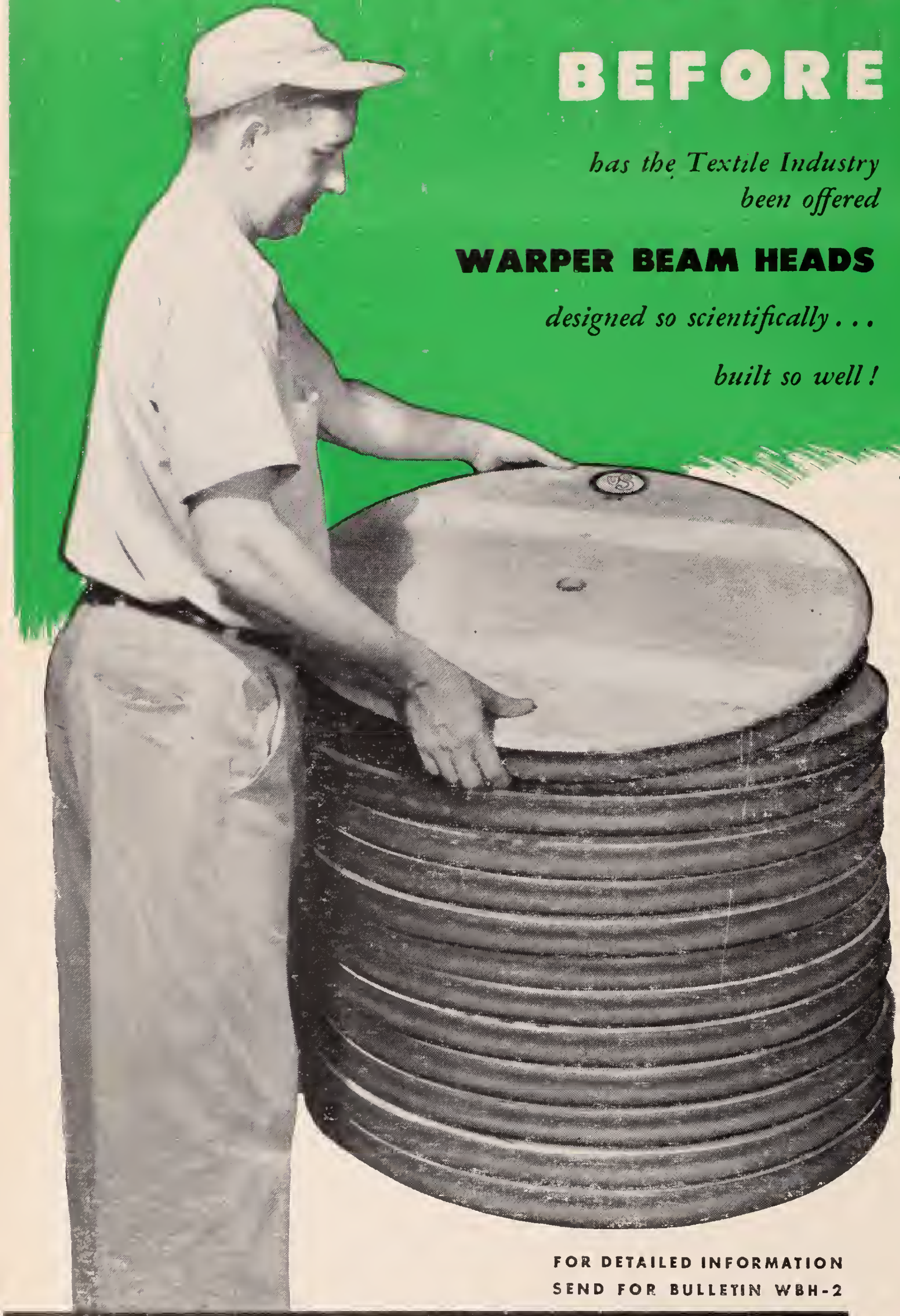

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Bobbin and Beaker

Official Student Publication
Clemson Textile School

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THE COVER

Mr. L. H. Jameson, Instructor of Textiles at Clemson, is shown making adjustment on one of the Jacquard Looms now being used for instruction at Clemson.

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THE BOBBIN AND BEAKER is a non-profit magazine organized to serve Clemson students and the textile industry. The publishing and circulation costs are financed solely through proceeds received for advertisements. We ask our readers to consider favorably our advertisers when buying.

ENGRAVING ON WATCH WHEELS

DR. HUGH M. BROWN
Dean of Textiles

A friend of mine once said, "Why don't they leave engraving off watch wheels to sell them cheaper? The engraving on the works does not make the watch run any better."

I asked him if he thought the craftsmen making watches would put in as high quality workmanship if they were told that the engraving would be left off so the watches could be sold at a lower price. He paused a little then agreed they would probably at once use less care in making the high precision parts, so that possibly the engraving on the works does make watches run better.

I have visited many textile mills that were proud of their good "housekeeping." Racks of yarn spools would be equally spaced in straight rows even though they might be moved the next hour. At first thought one would wonder why keeping the yarn racks exactly in line would make better fabrics or be worth the extra care in placing the racks. But progressive administrators are learning that having good housekeeping results in the workers using more care in all the operations that really count in producing a quality product. The Mills are learning that only if the workers can be proud of their plant will they make really praise worthy products.

Not only does the whole operation make more profits when time is taken for keeping a plant clean and orderly but aside from profits good housekeeping results in more joy of work, more good will and better morale throughout the mill. In other words, I guess yarn will run better if the racks are kept straight.

Hance Receives Position With The Textile Institute

Roger Milliken, Chairman of the Board of Trustees of the Institute of Textile Technology, today announced the election of Dr. L. H. Hance as the Executive Vice-President of the Institute effective immediately and as President-Elect to succeed Dr. J. L. Vaughan who has been on leave of absence for the past two years from the University of Virginia and will resume his duties there on September 1.

Born in Lancaster, South Carolina, Dr. Hance has had textile experience in mills and has been educated in textile institutions. He was graduated from Clemson College with high honors and became a member of the faculty of his alma mater.

Later he attended the Institute of Textile Technology, receiving both the M.S. and Ph.D. degrees.

Upon completion of his graduate training, he was appointed to the staff of the Institute of Textile Technology as a Research Associate. He then was appointed Chairman of the Committee on Academic Studies and recently Assistant Technical Director.

During World War II, Dr. Hance served for thirty-four months in the Infantry, rising from private to the rank of captain.

He is a member of Phi Kappa Phi, holder of the Norris Medal for distinguished scholarship at Clemson College, Phi Psi, Alpha Phi Omega, Phi Eta Sigma, and Tiger Brotherhood.

Dr. Hance is also well known among educators, being a member of the National Council of Textile School Deans, Conference of Deans of Southern Graduate Schools, and the American Society for Engineering Education.

He is active in church work and is now serving on the Board of Deacons of the University Baptist Church.

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Quartermaster Corps "Acid Test"

Lt. Col. Robert L. Harllee

Our country is proud of what we have chosen to call "the American standard of living." Through the Quartermaster Corps, the Army has sought to provide the military equivalent of that high standard to our men in service. To maintain this standard, the Quartermaster Corps procures tremendous quantities of superior textiles and is one of the largest buyers in this field. This buying has been a great support to the cotton farmer and to the textile industry of the South.

Quartermaster Corps Research and Development has as its major function the continual development and testing of textiles and other end items which compose the clothing and equipage of the United States soldier. The Quartermaster Board plays one of the most important roles in Research and Development in that it is the chief field testing agency for The Quartermaster General. Through field tests the Quartermaster Board supplies the vital answer as to the success of this development work.

The Quartermaster Board was established in 1934 as a part of the Quartermaster School in Philadelphia. In 1941 the Board was separated from the School and assumed its present duties at Fort Lee, Virginia. During World War II it achieved the distinction of being awarded the Meritorious Unit Citation three times.

Laboratory work is not part of the Quartermaster Board function. We do not directly initiate the development of new items, but results of Board tests aid in the development of experimental clothing and equipment and point the way for their improvement.

Field testing has many ramifications, but its foremost purpose is to determine whether new developments, depending on their nature, enhance the fighting efficiency of the soldier or improve the operational tasks of the Army. With respect to clothing, the criterion is: "Make it light and durable, consistent with functional suitability." If the weather is hot, we try to make him cooler; if it is cold, we try to keep him warm, but, at the same time, prevent overheating. This is a never-ending task, as perfection is a difficult goal.

New ideas and modifications of old ones are nurtured in the Research and Development Division of the Office of the Quartermaster General in Washington. Industry is one of the greatest sources of new developments. Without this great potential, much of the success which the U.S. Army has known in outfitting its soldiers to combat the elements as well as the enemy would never have been realized.

Once a development has been placed in the research and development mill, such things as cost, production facilities, raw material availability, etc., are considered. If these tests are passed successfully and if the development so lends itself, laboratory tests may be in order. The laboratory has its place in the sun in research and development, but field

(Editor's note: Lt. Col. Harllee is a native of Florence, S. C., and a graduate of Clemson College, Class of 1938. After his graduation from Clemson, Col. Harllee was employed by Burlington Mills until he entered the U. S. Army and began his military career in September, 1940.

Col. Harllee also holds a Master of Science degree from the Georgia Institute of Technology. His degree covers all the courses in the Textile curriculum except a Thesis, and includes the fields of Industrial Engineering, Industrial Management, and Safety Engineering. While at The Georgia Institute of Technology, Col. Harllee had the honor to be initiated into the Theta Chapter of Phi Psi Fraternity.

Col. Harllee is married and has recently been presented a son, his second.)

testing is the final convincer. If the item performs well while being worn or used by the soldier engaged in realistic activities, a major hurdle has been crossed. If it does not, additional development must take place or a new angle of approach must be attempted in research.

Scientific field testing as conducted by the Quartermaster Board serves to reduce the time it takes to obtain the answer, whether an item is good or bad. This stretches the research dollar and makes research and development funds go farther. However, most important to the taxpayer, realistic field testing enables putting the taxpayer's dollar to the best use. Prior to committing a contract, it is known that the new development will perform in the field. Thus, precious dollars are not wasted on useless procurement.

Over a period of years, the Quartermaster Board has developed testing techniques which have resolved themselves into three major categories: Accelerated Control Tests; Normal Use Tests at U.S. Posts, Camps and Stations; and Environmental Field Tests.

Accelerated control tests are conducted on the various test facilities located at the Quartermaster Board. These include a Combat Course, Shoe Track, Rain Course and Glove Course. A great deal of study has been done in designing these facilities for specific tests and to correlate with field results. Fabrics of blended fibers, varying staple length, various twists, different finishes, etc., are tested on the Combat Course and results obtained in a matter of days or weeks. If the test requires rainfall, the Rain Course is brought into action. The rate of rainfall can be controlled at 0.1", 1" and 3" an hour. Concurrent with tests for water repellency, clothing and footwear can be tested for durability and functional suitability utilizing a combat course or shoe track built into the rain testing facility. Experimental gloves can be worn out in a matter of days on the Glove Course, performing such activities as punching a bag, handling bricks, loading operations, etc. Footwear takes a tremendous beating on the Board's Shoe Track designed to test the soles and uppers of various types of shoes and boots.

The Products Testing and Survey Divisions share the following two catergories of tests. These are the two test sections of the Quartermaster Board, and it is their responsibility to perform the many tests assigned. The Survey Division carries out studies which involve soldier acceptance of various rations and food stuffs, packaging methods and procedural surveys, psychological performance, etc. The Products Division limits itself to end product testing, as

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Warp Tension Is Constant On C-4 Looms at Clemson

By Hugh M. Brown
Dean, School of Textiles, Clemson College

Through research at Clemson College, we have eliminated the necessity for daily checking of the warps on a loom for correct tension. The usual procedure in well-run weave rooms, as we understand it, is to check the warp tension on each shift and adjust the let-off weights to insure constant warp tension.

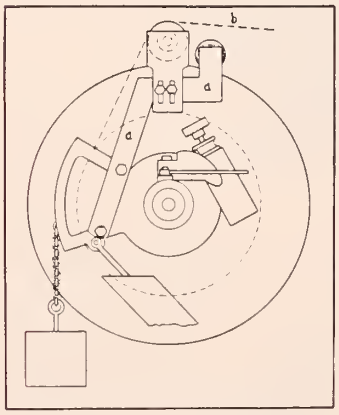
We removed the whiproll from the loom frame and mounted it, through a rigid frame, on the beam itself. The whiproll oscillates with the precision let-off and eliminates the dead weight that existed when the whiproll was attached to the loom frame.

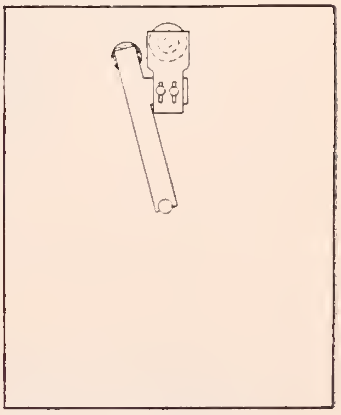
Since, essentially, the whiproll is mounted on the beam, the forces between the beam, and the whiproll are internal forces. Only two external forces exist on the new arrangement: Energy is necessary to rotate the beam to release the warp, and the mass inertia of the let-off weights must be overcome.

The internal forces always act at a constant radius from the axis of the beam to the axis of the whiproll, therefore the amount of yarn on the beam has no effect on the warp tension.

The weight for any desired force on the warp can be accurately computed. When the warp beam has the correct amount of weight for a given fabric, the weights never need to be changed as the yarn is wound from the beam.

With this arrangement it is possible to have the tension exactly the same on any number of looms.





THE WHIPROLL STAND on the let-off end of the loom is bolted to bar a. The bar is bolted to the let-off-chain and the housing. The warp is shown at b.

A BAR IS PIVOTED on the beam gudgeon. The drive-end whiproll stand is fastened to the projection on the bar. The bar is fastened to the let-off through a shaft.

THE FUTURE OF THE TEXTILE INDUSTRY AND HOW IT WILL AFFECT TEXTILE EDUCATION

(Editor's note: The following is the speech presented by Mr. J. McConnell at the National Council of Textile School Deans Meeting in Boston on November 11, 1952.)

The subject that we are to discuss today on this panel is certainly a very interesting one to me. I have been associated with the cotton textile industry continuously for forty-five years, I have seen it shrink from thirty-four million cotton spindles in 1924 to its present size of approximately twenty-four million spindles operating on cotton and man made fibers, yet today cotton consumption and production alone is nearly 80% greater than it was in 1924.

Last year the Textile World published a booklet, which you may have read, that had some very interesting information about the Textile Industry and the following is taken from this booklet. Textile manufacturing is one of the world's largest industries. In the United States alone it employs a million and a quarter people.

Among the twenty industries listed in the latest U.S. Census of Manufacturers (1947) the textile industry ranks

2nd in number of production and related employees
2nd in number of plants having over 100 employees each
3rd in total number of employees
5th in value added to raw material by manufacture
5th in wages and salaries paid

Still quoting, the value of its products nearly trebled from 1939 to 1947, rising from $4 billion to $11 billion.

Further increases in value from 1947 to 1950 brought this value to 15 billion dollars.

From 1945 to 1950 according to estimates $2½ billions was spent for new machinery, other major equipment, and new buildings. In 1950 the total amount of money expended for capital and operating expenses was about $8 billion.

So my friends paraphrasing an old saying a little "we are connected with no mean industry."

Although on this panel I am supposed to represent the Textile Machinery Manufacturers, I hope the other members will forgive me if I invade their fields. I am intensely interested in every phase of the industry. Most of my working life was spent in the mill end of the business, beginning in 1907 and ending in 1935. Since 1935 I have been connected with the machinery manufacturing section. During my mill years I saw the birth of the Textile Engineering Consultants and the beginning of real Textile Research and have been privileged to have rather close contacts with both of these important segments of the industry.

To discuss the probable future of the textile industry and to try to evaluate what effect it will have on textile education, it will be necessary to review the past because after all the only safe basis to work from is to assume that certain changes which have been brought about in the past in the way of improved methods of manufacture and research will when similar situations are presented occur in the future with this addition, the changes and improvements will be adopted more readily and put into effect at a much more accelerated rate.

There are many question marks along the road to the future of the Textile Industry. One of the most important is

"To what degree will man made fibers affect the industry?" To answer this question intelligently, let's see what has happened in fibers for the past thirteen years.

Going back to 1939 we find the total poundage of all fibers produced was four and a half billion pounds. Divided among the different fibers as follows

Cotton	80%	Silk	1%
Wool	9%	Man Made	10%

In 1950, the total poundage of all fibers produced was 6 billion, 700 million pounds. Divided as follows

Cotton	69.4%	Silk	.1%
Wool	9.1%	Man Made	21.3%

These figures show that total consumption per capita of all fibers increased from 31 pounds per capita to 41 or approximately 33-1/3% in this period. While man made fibers made a tremendous increase, it is interesting to note that the use of all fibers increased per capita with the exception of silk. The increases were as follows

Cotton increased	10%
Wool increased	50%
Man Made Fibers	193%

In connection with man made fibers, the new fibers, Nylon, Orlon, Dacron, Acrilan, Seran, X51, Dynel, Vinyon and others will in all probability have a great influence on the industry but at the moment it is impossible to foresee to what extent these fibers will be produced and to what degree they will be accepted. However without question they will be produced increasingly in the near future as new plants now being built get under way.

(continued on page seventeen)

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Work Load Determination

R. G. Carson, Jr.

More and more textile plant managers are realizing the value of a good Industrial Engineering department staffed by competent, well trained men. The main function of this department is to develop better work methods and set work loads. If wage incentives are used, the department is charged with designing the incentive plans and setting the work loads to fit plans.

The department may also perform a variety of other duties, ranging from statistical control to general trouble shooting, so it is an excellent training ground for potential supervisors. However, methods study, time study, and wage incentive plans remain the primary function of such a department. These three items are closely related. Too often, unscrupulous people have set work loads with little or no consideration for the people on the job. Untrained people have set work loads without sufficient knowledge of the facts of the job. Later, piece rates were arbitrarily adjusted to bring earnings into line with some pre-conceived amount. It is little wonder that the work of the Industrial Engineering department is often accepted with little enthusiasm.

A good methods and time study program should proceed along these lines:

1. The machine tender, second hand, overseer and industrial engineer should work together to develop the best method of performing the job. This should be a cooperative venture, not the results of the industrial engineer's work alone.

2. The best method should be adopted as the standard method. A complete record must be obtained of this method. Motion study charts and pre-determined time systems can be used to good advantage not only to develop the new method but also to record the method.

3. All operators are trained to follow the standard method. This often involves re-training people who have strong work habits to overcome. This takes time. If piece rates or other form of incentive payment are involved, guaranteed average earnings or other fair remuneration must be paid during the retraining period to protect the operator from a loss of earnings. He can't be expected to pay for his own training.

4. The time it should take for a well trained operator to perform the job is determined. This can be done through a time study of the job or through the use of such systems of pre-determined data as Basic Motion Time Study or Methods Time Measurement. At the present time, most mills establish their standards by means of stop watch time study. A time study is taken of each operator on the operation, even if some of the time studies are brief. This provides a good check on the operator training carried out in the previous step, and also aids in later "selling" the work load. The standard time for the job is computed from the time study data. Of course, personal time, fatigue and delay allowances are included in the standard time.

5. The standard time for the job is explained to the superintendent, overseer and second hands. They should all understand and agree to the resulting work load. After this, the time standard and the resulting work load is explained to the operators. This step is essential. It is usually done by means of a meeting, during which the industrial engineer goes

(continued on page fourteen)

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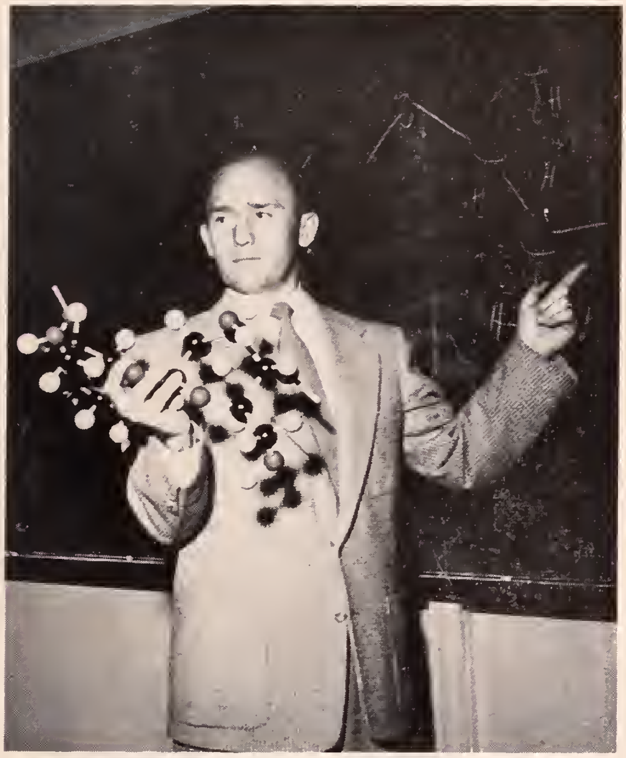
New Professors

By T. F. Kennett '53



PROF. ROSCOE BREAZEALE

A new face in the textile department is that of Professor Breazeale, who is professor of textile chemistry. Last semester was the beginning of professor Breazeale's teaching career here at Clemson College, but he has already distinguished himself among the students.

Professor Breazeale was born at Pickens, S. C., and attended and graduated from high school there. Mr. Breazeale spent two years at Mars Hill College, upon graduation from high school, and then went on to Duke University. He later attended the University of South Carolina where he received his B.S. and M. S. degrees in chemistry.

Mr. Breazeale spent one and a half years in the army where he held the rate of private. He then attended O.C.S. and received his commission as a 2nd Lieutenant. He received his commission in chemical warfare service and was assigned to the Air Force as a chemical staff officer. He served in the Air Force for four years and reached the rank of Captain, which he held at the time of his discharge.

Mr. Breazeale served with the Continental Chemical Co., where he did production work for one year. His next industrial experience was with the American Enka Corporation of Asheville, N. C., where he served for two years as a research chemist.

He is married and has one son. His favorite hobby is hiking and he is very interested in Boy Scout work. He is a member of the Presbyterian Church and also belongs to the Masonic Lodge, where he is a 32nd degree Mason. He belongs to the American Chemical Society and The American Legion. He is also a member of the Air Force Reserves where he holds the rank of Captain.

Professor Breazeale is well liked by the students and we wish him much success here at Clemson.

PROF. ROBERT CARSON

One of the most interesting personalities found in the textile department of Clemson is Professor Robert G. Carson. Professor Carson is well known to most textile students as "Sunset" and is at present the professor of time study.

Professor Carson was born in Orangeburg, S. C., in 1919, and finished grade and high school there. Upon graduation from high school, Professor Carson entered Clemson College where he graduated in 1939, receiving a B.S. degree in Weaving and Design. He was very active in the textile school and was a member of the Phi Psi Fraternity while here.

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LINTHOUSE PERSONALITIES

By R. F. Compton, TM '54

C. V. WRAY

Mr. Wray was born in Sandersvillle, Ga., and attended high school in Elberton, Ga. Upon his graduation from Elberton High School in 1934, he entered Clemson College. Mr. Wray had been enrolled at Clemson for two years when, in June, 1936, he accepted a position as Junior Scientific Aid in the U.S.D.A. Cotton Spinning Research Laboratory at Clemson.

He re-entered Clemson College in September, 1938. His extra-curricular activities included membership in The Blue Key, Phi Psi Fraternity, The Tiger Brotherhood, and the Senior Platoon. Aside from these many activities, he found time to hold the position as Editor-In-Chief of Taps, and hold a position on the Cadet Brigade staff.

Mr. Wray received a Bachelor of Science degree in Textile Engineering in June, 1940. Shortly thereafter, he was called into active service with the U.S. Army. He served for a period of four and one-half years, attaining the rank of Captain. During this time, Mr. Wray served in Australia, New Guinea, and in the Office of the Quartermaster General at Washington, D. C.

After his discharge in 1945, Mr. Wray accepted a position with Dan River Mills in Danville, Va. He rose to the position of Night Superintendent of Number 1 and 2 Mills. While in Danville, he attended and served as instructor on quite a number of courses, such as Foremanship and Industrial Management.

In 1947, he moved to Scotdale, Ga., where he became Superintendent of Georgia Duck and Cordage Mill.

In June, 1949, Mr. Wray returned to Clemson to serve in the Textile Management Department. During the summer months, he has been working toward a Master of Science degree at Georgia Institute of Technology. Mr. Wray is married and has a son, age eleven months. He is a Steward in the Clemson Methodist Church. He is a 32nd Degree Mason and a Shriner. Among his hobbies are: Fishing, Reading, and giving as much time as possible toward rearing his new son.

J. H. MARVIN, JR.

Mr. Marvin was born September 27, 1919, in Colleton County, but spent most of his childhood in Beaufort County, where he attended Beaufort High School. He graduated from Beaufort High School in 1936.

(continued on page twenty-three)

Teaching Yarn Manufacture at Clemson

By Gaston Gage, Head, Carding and Spinning Department

We have many visitors to the School of Textiles at Clemson. One of the most commonly asked questions is "are you teaching a course in the processing of man made fibers?" In the particular case of the Yarn Manufacturing Department, this means processing these fibers from the raw material into yarn.

The exact answer to the question is "no". We have no course that goes by this title. But we do teach the processing of man made staple fibers in all the yarn manufacturing courses where it applies.

"Staple fiber" is the name given to these synthetic fibers which are spun into yarn. The fiber is originally manufactured into continuous filament. When it is processed in this form it is called filament "rayon" or whatever kind of fiber it may be. Fabrics made from this filament fiber have a slick, smooth look and feel because of the absence of exposed fiber ends.

To get a softer look and feel to the fabric, this filament is cut into short lengths and spun into yarn, using the cotton system of yarn manufacturing. This gives the exposed fiber ends.

In the beginning, the fiber length used approximated that of cotton, with the intention of spinning it on cotton machinery. It was soon evident that a longer staple was desirable. This led to the length of 1½ inches because this was the longest staple that most cotton processing machinery would accommodate.

As time passed it became desirable to use longer staple lengths to make possible the spinning of coarser deniers to get the desired "hand" or feel. This change required machinery where the drafting rolls could be spread wider to accommodate this longer staple. This spreading went on to take staple lengths up to four inches.

The next logical step was to use this same system to process worsteds as the staple length here is from four to five inches.

On the roving frames and spinning frames designed to process these longer staples, the machine from the drafting rolls down to the floor is identical with any cotton roving frame or spinning frame of the same make.

The spindle drives are the same, the twisting arrangement is the same and the builder motion is the same.

Therefore, since we are using practically the same machines and same principles, with minor adjustments, to process synthetic fibers, wool and cotton, we include all these in the same course in spinning and in the same course in roving frames, merely calling attention to the peculiar requirements of each fiber. To do otherwise would lead to endless duplication.

When these different fibers are blended with each other—as is so often done—there is no way to teach their processing separately, the course in spinning must necessarily be all inclusive.

In the course that deals with cards and drawing frames we simply include the pin drafter and roller top card in the machines used.

The principle of the pin drafter and its use falls in the same processing spot as the drawing frame. It is covered in the course along with the drawing frame.

Both cotton and man made fibers are run on the revolving flat card. Its use with these fibers is taught along with its use in the case of cotton. For the longer staples we teach the principle of the roller top card and where it differs from the flat top card.

Our first course in yarn manufacturing is entitled, "Opening, Blending, and Cleaning." Of course the the man made fibers do not have to be cleaned. They do have to be opened and blended.

We cover the different problems faced in connection with the opening of cotton and the opening of the synthetic fibers. In most cases, some machines are connected to both problems.

In blending, much of the same system is used for blending different bales of cotton and different kinds of fibers, so blending, in all its ramifications, is taken up in this course. The application and results of this blending is touched on in the appropriate places in subsequent courses.

In view of the above we do not feel that a separate course on yarn manufacturing for man made fibers and worsted is either necessary or desirable, but that the subject matter can be covered best by teaching the courses as processes, covering all fibers as we go.

In the first semester of 1952 we had in the process of manufacture in the yarn manufacturing department the following materials:

1. Combed cotton
2. Carded cotton
3. Blend, vicose 50%, cotton 50%
4. Blend 50% 3 denier 1 9/16" viscose and 50% 3 denier 1 9/16" acetate.
5. Blend 75% 1.5 denier 1 1/2" viscose and 25% 1.5 denier 1 1/2" nylon
6. Blend 50% 1.5 denier 1 1/2" viscose and 50% 1.5 denier 1 1/2" acetate

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WORK LOAD DETERMINATION

(continued from page ten)

over the completed rate sheet in detail. Questions about the procedure and calculations are encouraged. Each operator should understand exactly what is expected of him. If an incentive plan is involved, he should know exactly how an increase in production will affect his pay. The operator should be encouraged to go to his supervisor with additional questions if he thinks of something later that he doesn't understand. The full explanation of the rate sheet should be given to the operators on each shift.

6. A member of the standards department should be on the floor of the department the first day or two the new work loads are put into effect. He should check with each operator toward the end of the shift, and see how the operator did in comparison to expected production or earnings. If things go well the first day, all that is necessary after that are daily spot checks for the next few days. Of course, production and earnings should also be checked daily for the first week or two and more infrequently after that. The job is not complete until the operators are meeting the standard.

The technical aspects of the job are not hard. Most high school graduates can learn to do a competent job of methods and time study. The really important part is the human relations. Too often, (more so in the past than now, I'm glad to report) the work load is computed by the industrial engineering department and passed on to the overseer and the pay roll department with no attempt by anyone to see that the operator understands what is expected of him or why. Sometimes the operators are not using the method on which the workload is set, and no attempt is made to teach them this method. Evidently, the management expects the operator to learn it for himself and if he does not that's just his hard luck. Unfortunately, it is also the hard luck of the management. The company loses too when an employee is dissatisfied and his earnings are lower than they should be because he doesn't know how to perform his job. Besides losing the good will and sometimes the services of a good employee, management loses the savings in overhead resulting from more productivity per employee and machine hour.

Training should start at the top. The vice-president or the general manager in charge of production do not need to know how to set work loads, but they do need to know what can be expected from a program like that outlined above. They need to believe in the merit of using the right approach. Other levels of management, particularly overseers, shift foremen, and second hands, should be given a course in methods improvement, time study, and wage incentives. This can be done in night classes, or in classes during the shift. It may have to be done twice, so that all supervisors won't be pulled off the job at the the same time. About 20 to 25 hours, in two hours sessions, should be enough to get the basic principles across. This is followed up by the continuous training that goes on during the meetings used to explain specific work loads to the supervisors. If an employee has a question about the work load, he is likely to go to his second hand with it first. If the second hand understands the rate sheet, and can answer the question satisfactorily, he increases the employee's confidence in the fairness of the work load. Of course, some questions may have to be referred to the standards department, either directly or by means of the second hand finding the answer and taking it back to the employee.

Work simplication or general methods improvement principles, can be carried even lower in the organization through short courses. Loom fixers, section hands, and machine tenders can benefit from work simplification training. Posters and employee publications can be used to carry work simplification to all employees.

Because methods and time study procedures have been too often abused in the past, certain specific guarantees should be made to the operators. These are:

1. No operator will be thrown out of work as a result of methods and time study. This guarantee can be met by placing displaced persons on other jobs in the plant. If there are none open, create a job until something does come open. Even the best plants have some turnover, and this will soon provide openings for the extra people.

2. Time standards are guaranteed against change for as long as conditions remain the same. If the method, materials, or machine is changed, change only the affected part of the standard. Make no change regardless of how high earnings may go unless the job conditions change.

3. Payment will be made for downtime or nonproductive time during the day beyond the control of the operator. This is usually at base pay if the operator has no other work to do. The operator is usually paid at past average earnings for work on such off standard jobs as sample developments or unusually bad material.

This program is no substitute for good management or good supervisors, but in fact calls for supervisors of a higher caliber. It should however, result in

lower cost per pound produced
higher earnings for the operator
better machine utilization
better employee morale through more equitable work loads and earnings.

All this can be accomplished with no loss in quality if the program is carefully planned and fairly administered.

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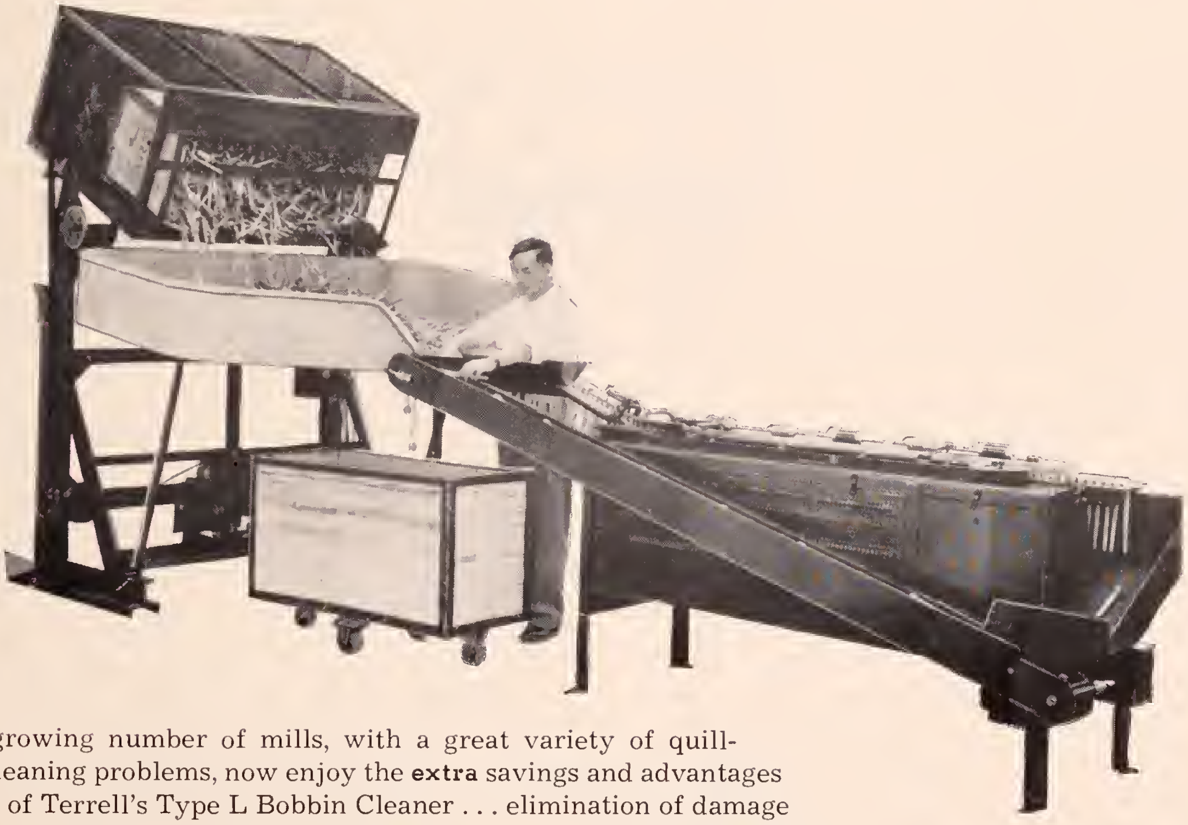

A growing number of mills, with a great variety of quill-cleaning problems, now enjoy the **extra** savings and advantages of Terrell's Type L Bobbin Cleaner . . . elimination of damage to bobbins . . . lower maintenance cost . . . fewer cloth seconds . . . reduced handling expense . . . plus the labor-saving advantages afforded by all Terrell equipment.

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DECATUR ILLINOIS

THE FUTURE OF THE TEXTILE INDUSTRY AND HOW IT WILL AFFECT TEXTILE EDUCATION

(continued from page eight)

In the past few years we have seen Nylon, Orlon and Dacron in combinations of blends with other man made fibers enter the men's suiting field in a large way and in the past year there have been new combinations of these fibers with wool made into fabrics for men's suiting where the wool content has been approximately 50% and according to reports, sales have been so large that mills are no longer offering these fabrics to the cutters because of the impossibility of getting enough of these fibers to meet the demand. These pure synthetics are so new and there has been so little experience with them it is not possible to estimate ultimate consumer desire or acceptance at this time but from present indications they will play an important part in the textiles of the future.

However looking over the whole field of man made fibers and remembering that the production of rayon and other man made fibers in this country has increased from 20 million pounds in 1920 to one and a quarter billion pounds in 1950, it is doubtful if these fibers will affect the industry of the future to any greater degree than they have in the past fifteen years.

Comparing all the fibers, cotton is still King with production and consumption of 4 billion, 680 million pounds annually; man made fibers are next with a billion and a quarter pounds; wool with 636 million and silk with only 8.4 million pounds.

These are 1950 figures and very close to our present production and consumption.

The next question mark is,

"What effect will design changes of machinery and new types of equipment have on the future of the industry?"

The past twenty-five years have seen very radical changes and improvements in machine design. While the automatic loom came in at the beginning of the century, it was not until the 1920s that the possibilities of economy of operation began to be realized. The Barber-Colman Spooler and Warper were being offered to the trade at about the end of World War I and these two machines practically revolutionized Spooling and Warping.

These major developments were followed rapidly by Long Draft Spinning and Roving and by One Process Pickers, each another fundamental improvement which in turn were followed by refinements in design and manufacturing which have resulted in greatly increased spindle speeds, loom speeds, with corresponding increase of production and improvement in quality.

During this period the high quality, high production combers were developed.

Also in the latter part of this period we have been passing through, the American System of Roving and Spinning was designed to handle the longer man made fibers and worsted fibers. This system marks an important change in the processing of worsted yarns. In the past ten years approximately 15% of worsted yarn production has been changed from Bradford and French Systems to the American. Here in the machinery field just as in the fiber field we can see nothing radically or fundamentally new in sight that will affect the industry any more in the future than it has been affected in the past twenty years by the improvements and developments in that period.

The next question is,

"What effect is research going to have on the future of the industry?"

Research has been a much abused term, in fact only a few years back almost any room set apart in a mill was termed a laboratory or a testing department or a Research Department.

Real Research Departments in connection with textile mills and textile machinery shops are comparatively new.

Many of the larger mill organizations today have splendid research departments, well organized and equipped. While a certain amount of mechanical research is being done by these organizations, the principle field for their research is in the lines of the textile products being produced by the sponsoring company.

A certain amount of pure research is being done in Research Units of this type but the potential possibilities of organizations like the Institute of Textile Technology at Charlottesville and the Textile Research Institute at Princeton for Pure Research are beyond any present calculation. From these Institutes should come information of great value to the entire textile industry. The Southern Research Laboratory at New Orleans has already contributed a great many things to the Industry and with its wonderful equipment and fine organization should be of increasing and great help.

The Rayon and Acetate industries are the great examples in textiles of the value of scientific research and probably were influential in causing the older lines of the Industry to investigate its possibilities.

The main causes for the delay on the part of textile mills and machine manufacturers in adopting scientific research were two. First, lack of interest or faith in Research, two, lack of funds for Research, because as we all know it takes a large investment to provide proper equipment, facilities and organizations to properly carry on this type of work and the returns are not evident for a long period of time. In

(continued on page nineteen)

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THE FUTURE OF THE TEXTILE INDUSTRY AND HOW IT WILL AFFECT TEXTILE EDUCATION

(continued from page seventeen)

defense of the Industry for not adopting research sooner and to a greater degree, the facts are that with few exceptions, mills made very meager profits for a period that covered from 1924 until the Second World War. While we in the old Textile lines including textile machinery manufacturers have not had enough experience in real scientific research to prophesy its effect on the future, without question it will be very great. Organizations like the Institute of Textile Technology, the Research Institute and the Southern Research Laboratory would probably call that statement conservative. These three question marks — Fibers, Machine Development, and Scientific Research plus Labor Relations are the big question marks of the industry. There are smaller ones which in the aggregate may be important but all together they point to one thing. The Textile Industry of the future will be carried on in a much more scientific and efficient manner than in the past.

We have seen in the past generation a great change in the ownership and control of the operating units in the industry. In the old days we saw large organizations like Amoskeag and Pacific operating cotton and woolen and worsted mills with their own dyeing and finishing plants and the Amoskeag even went into building textile machinery but there were not many if any other companies in that era with similar setups.

Today we see the great integrated companies like J. P. Stevens, Deering-Milliken, Berkshire, Burlington Mills, Lowenstein, The United Merchants, The Ely Walker Mills, Pepperell, Cannon, Reeves Bros., Avondale, Cone, West Point, and Springs controlling a big percentage of the industry with what may be called super top managements with outstanding vigorous far looking organizations all the way down the line.

With this picture of the industry, I have tried to present to you in mind, I would like to point out to you gentlemen, the part I think you and the young men who will train under you should play in the carrying on of this great industry.

The men who graduate from your schools and take their places in the industry will, in the future as in the past, play a big part in the business. I was very much impressed by the article in the DAILY NEWS RECORD of the survey of 2000 graduates of Lowell Textile Institute, made by Professor James W. Bell.

The survey showed that 9 of every 10 L. T. I. graduates are still in the textile industry in some branch. Fifty-five alumni are Vice Presidents, 150 are Manaagers, 73 are Superintendents, 116 have duties as Treasurers, Agents and so on. Most interesting fact is that all but a few of these alumni are employed in Massachusetts and the New England area.

Probably every school represented here could point to a similar record and this shows the great responsibility you gentlemen have to train these young men under your supervision so they will have the best preparation possible to carry on and develop this great industry to the fullest extent.

To do this you will need the proper tools. Facing facts and speaking plainly, up until within a comparatively few years, the majority of the Textile Schools in this country have not had adequate buildings, equipment or facilities. In the past few years great strides forward have been made. More money has been appropriated by your state governments, large sums of money have been raised by some of your alumni groups and you have received gifts particularly in this region from foundations like Textron. This money raised by all of these sources has resulted in great strides forward, some of the schools represented here have splendid new buildings, all of your schools have new equipment and some of you have been fortunate enough to benefit from foundations of sufficient size to enable you to pay salaries which will attract more able men to your faculties.

However, in my opinion, a great deal more should be done, more money should be appropriated by the states, more foundations supported by contributions from the textile industry and more groups of alumni should be formed to raise funds along the lines that the North Carolina State Alumni group has done so well. These young men who graduate from your schools and make this industry their life's work are going to need a better and better foundation to prepare them for a more and more competitive industry which will always be a vital part of our country's great economy.

TEACHING YARN MANUFACTURE

(continued from page thirteen)

7. 100% 1.5 denier 1 1/2" viscose
8. Blend, 40% 3 denier 2 1/2" viscose, 40% 3 denier 2 1/2" acetate, 20% 3 denier 3" Vicara
9. 100% viscose 5.5 denier 2 1/2"
10. 100% acetate 5.5 denier 4"
11. Blend 90% worsted, 10% orlon.

Some of these stocks have run out but we expect to start blends and fibers through during this semester. We use the standard mill practice of tinting for identification purposes.

The makers of all these man made fibers have been very liberal with the School of Textiles. They have donated to the school all the fibers that we have used, graciously supplying our every need. This we appreciate.

This article may give the impression that we put all our emphasis on man made fibers. This is far from true. We realize that every time the textile industry uses one pound of staple synthetic fibers it uses above seventeen pounds of cotton.

PHI PSI NEWS

By Arthur B. Swett

Plans are being made in the Textile School to conduct a professor rating this semester. All textile students will participate. The poll will be directed towards helping the professors improve their teaching techniques. The poll will be completed around the middle of this semester.

A steak supper was held at Seigler's Steak House in Walhalla on December 11. A very enjoyable social session followed. Professor R. G. Carson, chairman of the faculty placement committee, conducted an informal discussion at our last meeting to determine what type of placement service would be most effective for our graduates.

New officers for 1953 were elected by Iota chapter on December 18. The newly elected officers are Bennette E. Wilson of Spartanburg, president; George R. Morgan of Greenville, vice-president; Arthur B. Swett of Greenville, secretary-treasurer; John T. Messer of Inman, senior warden; and Ben K. Chreitzberg of Williamston, junior warden. The new officers were installed on January 8 by Professor H. L. Loveless, installing officer, and Prof. W. C. Whitten, installing marshall.

Twenty-six Clemson College seniors have been named to be listed in the 1952-53 edition of "Who's Who in American Universities and Colleges." Phi Psi was well represented, having four men named for this honor. Those named were William D. Asnip, Leonard G. Boyd, William P. Creighton, and Marvin Robinson.

The Iota chapter had six seniors to graduate in February and join the ranks of our many Phi Psi alumni. Those graduating were: William D. Asnip, Textile Manufacturing major from Clemson; LeonardG. Boyd, Textile Manufacturing Knitting major from Manson, Iowa; Rodolfo A. David, Textile Manufacturing Knitting major from Guatemala. Central America; Paul S. Monty, Textile Manufacturing major from Charlotte, N. C.; Charles E. Mundy, Textile Manufacturing major from Ware Shoals, S. C.; and Vernon M. Williams, Textile Manufacturing major from Enoree, S. C.

N. T. M. S. NEWS

DR. PAUL SEYDEL

DR. SEYDEL IS NTMS SPEAKER

Dr. Paul Seydel of the Seydel-Woolley and Co., of Atlanta, Ga., was guest speaker at the regular meeting of the National Textile Manufacturing Society on February 17 in the auditorium of the Textile School.

The textile executive spoke on the composition, interpretation and analysis of sizing compounds. Following his speech, Dr. Seydel showed a film, taken last summer in the Amazon jungle of South America, of the preparation of fibers for string and bark cloth.

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TEMPLES WITHOUT ROLLS DEVELOPED AT CLEMSON

By Hugh M. Brown
Dean, School of Textiles, Clemson College

(Editor's note: "The two following articles by Dr. Hugh M. Brown were originally published in the October 1952 issue of 'Textile World' ".

Cloth that is uniform from selvage to selvage can be woven if our new-type temple is used.

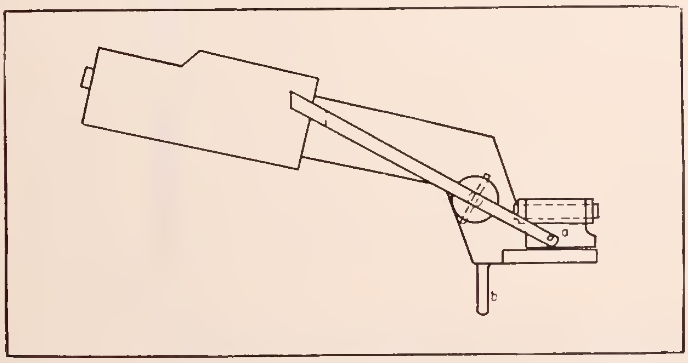
The temple is made from the basic parts of a rayon-type temple with the cap and the rolls removed. The end portion of the temple, where the rolls are recessed at the bottom, is cut off and replaced with a short, flat plate that extends even with the projection underneath the temple.

A clip, similar to a tenter-frame clip, is placed on the cap head. The clip pivots from a pin held by two short stands. A spring holds the clip in the normal holding position, and a lever, is pivoted to the temple from a stud and extends from the clip to the temple-arm housing.

When the lay is located at any position except front center, the clip locks the woven selvage in the temple. When the lay reaches the front center position, the projection at the base of the temple is struck by the lay, the temple is moved back a short distance, the lever strikes the temple-arm housing, the clip is pushed inward against the spring, and the cloth, released from the temple for a moment, is pulled forward.

The spring presses the clip back in its normal holding position when the the lay moves backward and the cloth is re-grasped.

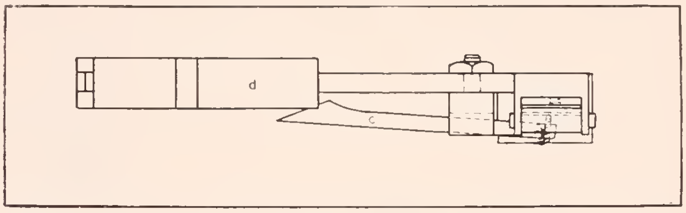
If the temple is purposely caused to release the cloth, it re-grips the cloth as soon as the lay reaches the front-center position again.



THE CLIP a IS RELEASED, and the cloth weaves down when the projection b at the bottom of the temple is struck by the lay.

It seems that this temple will hold any fabric that can be held by gripping only the selvages, and the cloth woven with the temple is uniform in appearance from selvage to selvage.

The clip should compensate for its own wear for a long time.



THE LEVER c AT THE CLIP presses against the temple case d to open the clip when the lay reaches front center.

NEW TYPE LENO DEVICE DEVELOPED AT CLEMSON

Dr. Hugh M. Brown, Dean

The Clemson School of Textiles has developed a new device which produces leno weaves without the use of doups. The arrangement is worked entirely from a dobby head which makes it possible to intermix, pick by pick, plain weave, ordinary leno, full-turn leno or even more full-turn leno.

The leno action is accomplished by running each pair of warp ends through holes in small pinion gears mounted in a bar behind the harnesses. On each pick the gears are rotated the required number of half turns for the leno desired and stopped with each pair of ends separated horizontally so that the right-hand end in every pair may be either raised or lowered by one special harness, while the left-hand end of each pair may be given the opposite motion by another similar harness.

The rack that rotates the pinions may be operated from two dobby levers and the intermixing sequence set up on the pattern chain. Considerable cross stripping effect can be had by intermixing picks of plain weaving, ordinary and full-term leno. The system works well on warp end spacings down to one fourth inch and is especially valuable for locking a weave having very widely spaced picks.

One application would be more economically making fruit and vegetable bagging material by more widely spacing ends and picks.

This device was first conceived by Dr. Hugh M. Brown, Dean of Textiles at Clemson College, and later developed by Mr. Evan A. LaRoche, Assistant Professor of Weaving at Clemson.

Our sincere good wish is

that you and your fellow
students will find all of
the gratification of achievement in your careers in
the textile industries
that your studies have
made possible.

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NEW PROFESSORS

(continued from page eleven)

He worked in the time study Department of Callaway Mills of LaGrange, Ga., from June, 1939, until January 1942. His work was interrupted at this time as he was called into the army where he served as an infantry officer. He spent twenty-six months in India, while in the army, training Chinese Nationalists troops. He received his honorable discharge from the army in March, 1946.

Next Mr. Carson taught at Clemson College from 1947 to 1949, during which time he expanded the time study course from one hour per week to its present status. Then he entered Georgia Tech where he received his M.S. degree in 1950. While at Tech he majored in Industrial Engineering and minored in Labor Relations. He was a member of Alpha Pi Mu, honorary Industrial Engineering Society while at Tech. He also taught half-time at Tech while working for his M. S. degree.

From Georgia Tech he went on to the University of Michigan and finished all his course work for his Ph.D. degree by 1952. He is now awaiting an acceptance of his thesis to obtain the degree. Mr. Carson taught half-time at the university while doing his graduate work.

Mr. Carson is a member of the American Institute of Industrial Engineers and the Society for the Advancement of Management. He is married, has three children and lives in Goodman Apartments on Wigington Street. He is also and active member of the Methodist Church.

LINTHOUSE PERSONALITIES

(continued from page twelve)

After working on a farm and in a merchantile store for a year, Mr. Marvin entered Clemson College in 1937. During his summers, between semesters at Clemson, Mr. Marvin worked in the spinning and Weaving Departments at Springs Cotton Mills, Fort Mill, S. C. He received a Bachelor of Science degree In Textile Engineering in 1941.

Mr. Marvin entered the U. S. Army in 1941 and received his training at the Medical Center, Camp Lee, Va. He then served as a Medical Technician in a Medical Battalion in the Panama Canal Zone for a year. After this, he was connected with a Medical Company, attached to several task forces in the Southwest Pacific until the summer of 1945.

After his separation from the Army, Mr. Marvin accepted a position with Judson Mills in Greenville, S. C., where he worked in the Standards Department until the summer of 1946.

Mr. Marvin then went to Dan River Mills at Danville, Va., where he worked in Production Control until his return to Clemson in February, 1949.

Mr. Marvin is married and has one baby girl.

QUARTERMASTER CORPS "ACID TEST"

(continued from page seven)

its name implies, although the latest techniques of interview and psychology are utilized to obtain subjective reaction.

If a test requires a specific climatic condition, the Board sends a test team to a desired area whether it be at the North Pole or the Equator. During the past winter test season the Board had teams in Canada, Newfoundland, Alaska and Panama; Fort Dix and Fort Monmouth, New Jersey; Exercise "Snowfall" at Camp Drum, New York; Exercise "Longhorn" in Texas; at the atomic test site, Camp Desert Rock, Nevada; and at the Board's own winter test site, Mt. Washington, New Hampshire. Last summer a team tested an experimental hot-dry uniform in the deserts of Arizona and California.

Wherever the test may be conducted, test data is studied by the technologist in charge of the test preparatory to writing the report. The technologist primarily responsible for each test has followed its progress throughout, having written the test plan and determined its individual requirements. Test data is analyzed statistically and reviewed meticulously to ascertain its correctness. The analysis section at the Board processes the final report to determine that test objectives have been satisfied based on test findings.

Although the Quartermaster Board is continuously engaged in field tests for the Quartermaster General, an internal program is carried out to improve the facilities and testing techniques employed. Just as industrial and military research never rests, the Board continues to develop its usefulness as a testing agency. Stagnant thought and satisfactory smugness are not by-words of the Quartermaster Board.

Testing clothing and equipment is a technical, tough, gloryless job, but our motto is "We Shall See." In keeping with this motto, the Quartermaster Board will do its part to see to it that our Army continues to be the best fed, the best clothed and the best equipped Army in the world.

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As The Editor Sees It - - -

By R. R. Fowler '53

"Why don't more students take an interest in extracurricular activities?" This has been the subject of some two or three conversations between a friend of mine, who is a member of the faculty at Clemson, and myself.

In regard to this subject, I would like to leave a few serious thoughts with, not only Textile students, but all Clemson students. Almost every day you, as a student, are exposed to the various fraternities, clubs, socials, and publications here on the campus. Daily you read their meeting calls on the various bulletin boards spotted over the campus. Everyone is familiar with most of these organizations, yet, how many of you take an active part in any of them? Of course, some of these fraternities have certain scholastic requirements that a student must meet before he becomes eligible for membership. Even then, the student must wait for an invitation from the fraternity before he can join it. And yet, there are many organizations, located in almost every school of study, which welcome any student who is interested in the organization and shows his willingness to sacrifice a little time for the organizations.

If an interested student would only take a little time to investigate one of these organizations, perhaps by talking to a friend who is a member, or by attending a meeting of the organization before deciding to become a member (this is permitted in many organizations), he probably would see the aims and purposes of this organization in a very favorable light.

Upon investigation, a student will learn that the work done by these organizations is not work which has to be done by someone. On the contrary, these organizations are not formed in order to give students jobs which have to be done. They are formed in order to give the student an opportunity to do things which he likes and wants to do.

These various organizations serve numerous purposes for their student members. To name a few: they enable him to meet other students and become better acquainted with his friends in the organization; they serve to strengthen a persons' initiative and sense of worth through accomplishment; they enable the student to become better acquainted with the faculty in most instances, which, very often leads to important contacts elsewhere. In any case, they will relieve the student of a certain amount of idle time. Too much idle time is often detrimental to a persons' initiative.

On the lighter side, these organizations are not "all work and no play." Every club has its' socials, banquets, movies, guest speakers, smokers, or just "bull sessions." Club meetings which feature a guest speaker or a good movie are often enjoyable and informative. And I have yet to see a person who failed to have a fine evening while wrapping himself around a good steak supper.

I'm sure that members of the many organizations at Clemson will agree that the time they contributed to these clubs has not been time "spent," but time invested.

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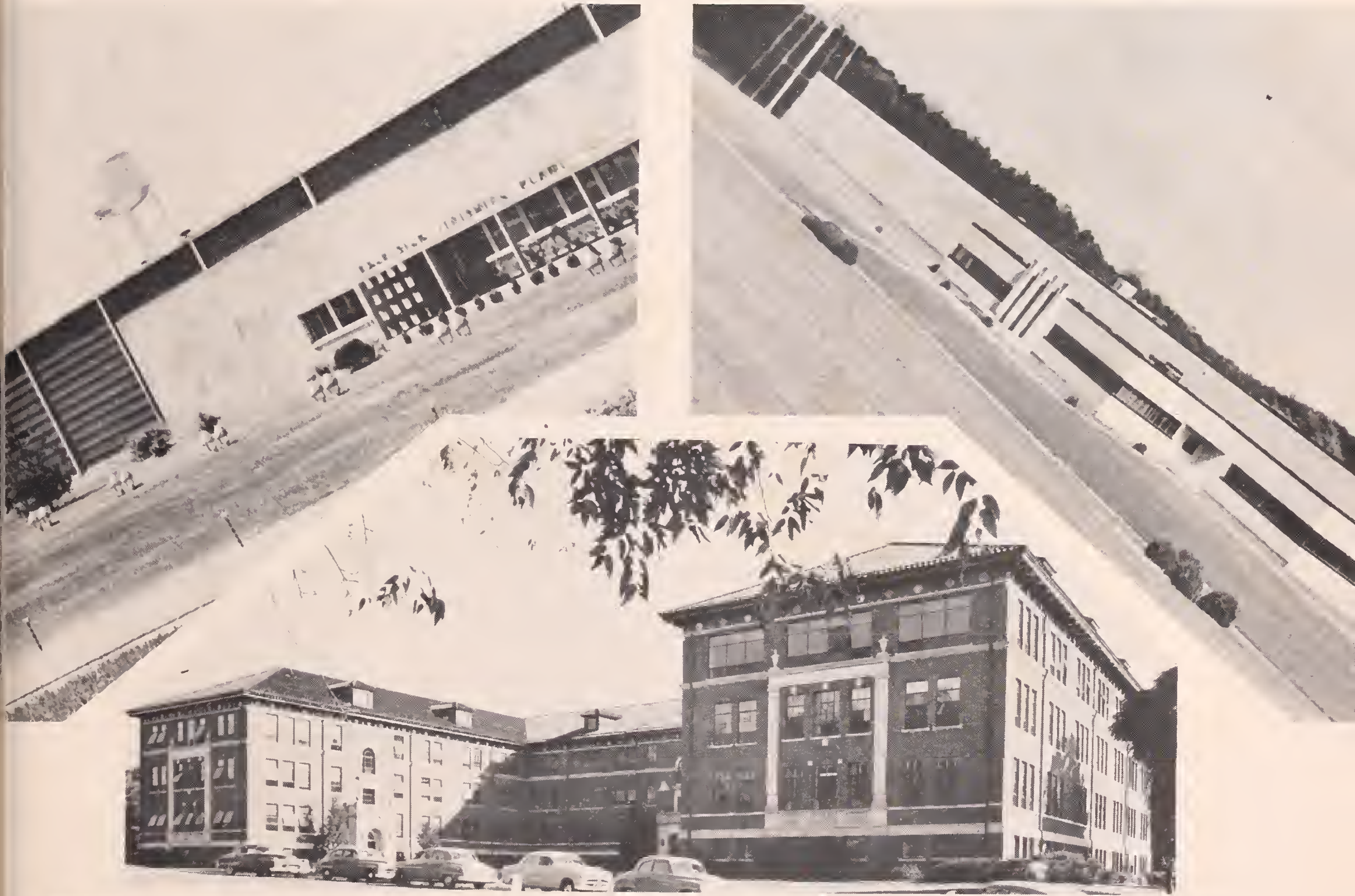
STUDENT PUBLICATION OF THE CLEMSON TEXTILE SCHOOL

No. 3 MAY 1953 Vol. II



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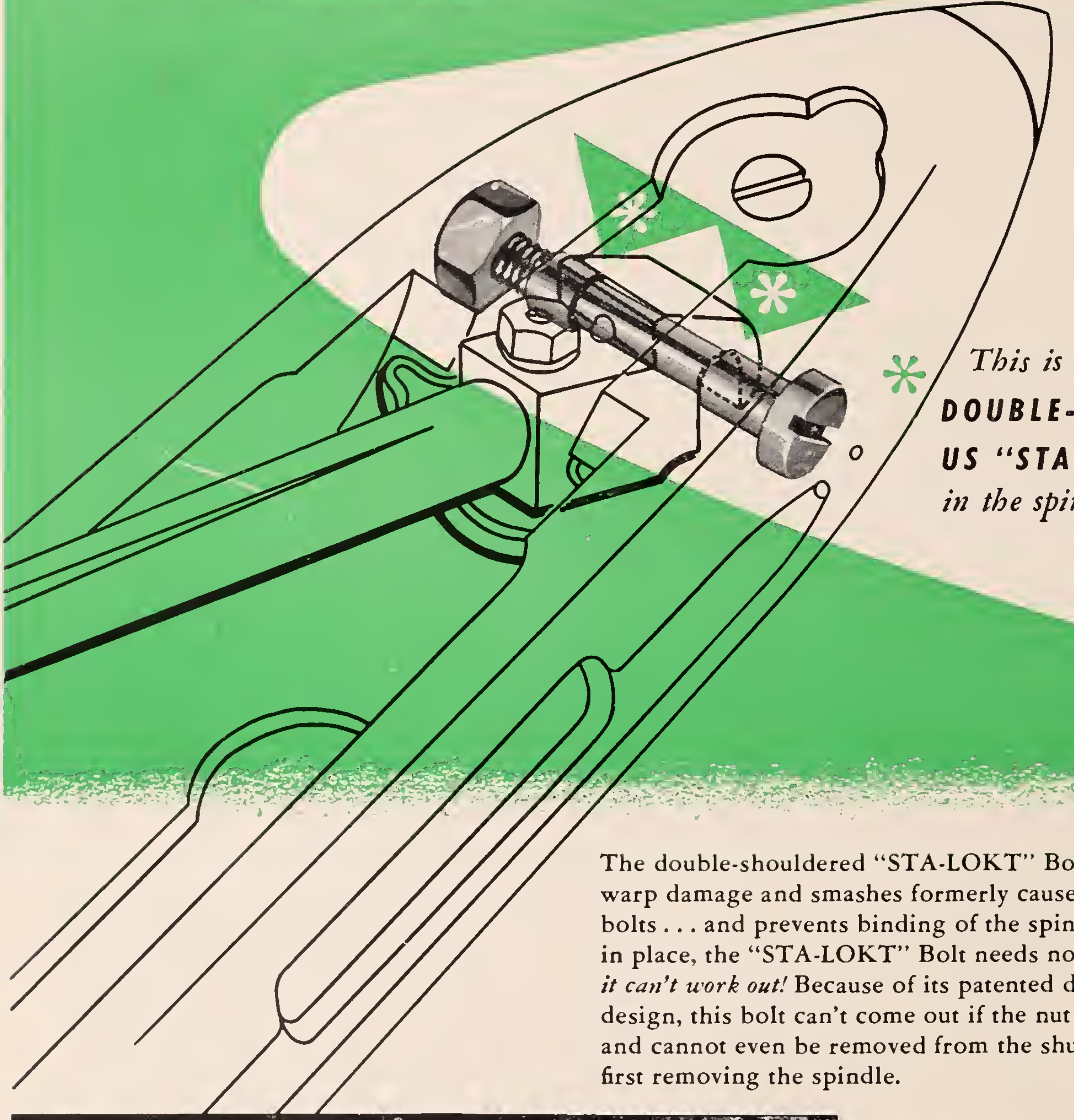

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THE

Bobbin and Beaker

Official Student Publication
Clemson Textile School

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THE COVER

The cover depicts the Clemson School of Textiles located in the center of the South's largest and fastest growing industry. Mills shown are Excelsior Finishing Plant, Excelsior Clemson Plant, and Utica-Mohawk Plant near Clemson.

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The Textile Graduate Challenge

DR. HUGH M. BROWN
Dean of Textiles

Never before has the textile graduate had such a chance to find his proper place in the industry. Wherein earlier days he looked, often long and hard, for an opening with most any company that would take him even at very low pay, he is now sought out by dozens of concerns. They send their representatives to spend hours on end interviewing the seniors and follow-up with tours of their plants with all expenses paid. High ranking personnel take time out to give them a picture of their organizations.

The men they hire, instead of having to prove themselves as of old with a broom, are now given training programs with a chance to learn many phases of the total production. Where once there may have been considerable resentment toward the textile graduate, there is now the finest good will and chances for help on every side. The present graduate will work in a cleaner, better lighted mill, even finding air-conditioning in an ever increasing number of plants.

Long before graduation the textile students has been aided by the industry. Practically every textile school has had a dominant part of its plant furnished outright by textile companies. Large grants of money have been donated for improving the teaching staffs.

It would be difficult to determine how many years a graduate must work in the plants to be worth what those plants have given him. This should be an inspiring challenge to every graduate to prove himself in his job, humbly realizing that he is in great debt and that he must advance himself as rapidly as possible, both for his own sake and for his company. He can have the proud assurance that many other graduates before him have met the challenge, knowing that only by hard work, continued study and a fine, fair attitude toward all who work under or over them could their mill earned the profits that made their opportunities possible.

Graduates will soon learn that profits and wages, though essential, are only part of the challenge. Before there can be profits in these times there must be good will, joy in work well done and a pride in the product among all the personnel from the President to the sweepers. The graduate who does his part to make this possible in his chosen company meets the industry's challenge.

Clemson Student to Represent Southern Area At Chicago

At the recent spring meeting of the Piedmont Section of the American Association of Textile Chemists and Colorists, the report of a group of Clemson textile chemistry students on their original research work, was chosen to represent the entire Southern area at the National Convention of this Association.

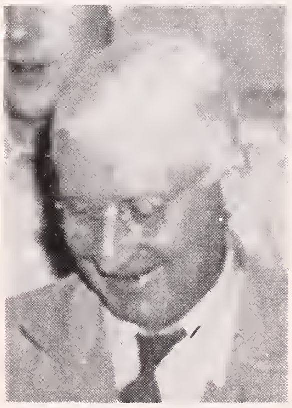
Members of this group were Lonnie T. Howard, Paul N. Robinette, Charles B. Simpson and Fitzhugh L. Wickham, and the subject of their research was, "The Dyeing of Union Shades on Blends of Dacron or Orlon with Wool." These students have selected Lonnie Howard to present the paper for them, and he will receive an expense paid trip, from the association, to participate in the national contest with students of other geographical divisions of the association. This contest will be held as part of the program of the National Convention in Chicago next September.

Professor W. G. Blair Passes

Gaston Gage, Head
Yarn Manufacturing Department

Professor William Gardiner Blair died at his home at Clemson on March 17, 1953. He had retired from teaching on September 1, 1952 because of heart trouble, which he had suffered from for more than a year or two.

He is survived by his widow, Mrs. Lena Lawton Blair and one son, Clyde, who has a position with one of the Deering Milliken Mills. He also leaves two brothers.



Professor Blair was born in Whitinsville, Mass. His first work was with Whitin Machine Works and this always held a high place in his affections.

He attended New Bedford Textile School and later took some graduate work at Clemson during the summers.

It was in the fall of 1914 that Mr. Blair first came to Clemson and he taught in the School of Textiles until the spring of 1920. During this tour of duty the enrollment in the Textile School was small, there being only three members of the teaching staff. He left teaching at Clemson to go with the United States Department of Agriculture in spinning research and left this position to do spinning research for Armstrong Cork Company. After this he was with the Judson Mill for about one year. About this time Mr. Blair bought a farm in Greenville county where he lived and farmed until he returned to the Clemson faculty on September 1, 1936 to stay until his retirement.

Mr. Blair was a great favorite with the students. He always knew their names and called them "Mister." In turn they all called him "Pop." This was probably due to his prematurely white hair, because otherwise he never acted or looked old.

He was a great sports fan and baseball and basketball always seemed to have a stronger attraction than did football. He would stay to the bitter end of a baseball game and in the early spring "bitter" was sometimes correct. Only the pure in heart would brave the cold wind on Riggs Field for some games. Mrs. Blair would be there too and they continued to attend sports events after his retirement.

For years Mr. Blair served as faculty advisor for Phi Psi fraternity. The outstanding success of this fraternity at Clemson is largely due to his work and interest.

We at Clemson miss "Pop" Blair.

Industry and The Student Graduate

By George Asnip,
General Manager, Laurens Mill

It is obviously impossible in so brief an article to give a complete and detailed analysis of this tremendously broad subject. However, I will list my observations of several of the most important qualities which industry must have in a student graduate. I consider these several qualities to be of top priority, and to a significant degree, they are lacking in the student graduates that industry is now receiving from universities and colleges.

It is primary that a college or university have as its aim to provide instruction, experience, and motivation to each student so that he will graduate with the knowledge and the qualities of leadership required by a leader of industry and with the basis for continued development throughout his lifetime, leading to fitness for assuming responsibilities in industry of the highest order.

Indispensible are the following objectives:

1. To give the student the motivation for a lifetime of service to industry.
2. To give the student a balanced and liberal education in the arts and sciences in order to develop his powers of reasoning and analysis; to give him a firm grasp of the role of industry in a democratic society and an awareness of the problems facing industry; to give background of general knowledge enabling him to cope with the problems of industry.
3. To develop in the student those personal physical attributes and abilities needed by a leader of industry.
4. To give the student a basic education in the fundamentals and techniques of industry and in the roles and missions of industry in a democratic state.
5. To develop in the student a sense of duty and the qualities of character, leadership, integrity and loyalty.

It is to be understood that technical knowledge is of the greatest importance, and I wish to stress the fact that this phase of the student's education must not be minimized; however, consideration should be given to other qualities which must be developed in the student to best equip him to enter industry and become a leader.

Industry's first objective is to place the graduate in a position of basic responsibility—that of a supervisor. A supervisor is one who is responsible for the activities of a group of workers performing a job. The student graduate immediately as he enters industry will of course be indoctrinated into the industrial organization and will become familiar with company policies, practices, and basic operational processes. However, all this is only incidental to his ability to assume the position of supervisor in the least amount of time consistent with his individual ability to absorb those fundamentals of organizational policy, practice and procedure.

The student must develop a fine sense of responsibility with regard to his fellow man. This entails the ability to get along with people. A leader of industry is fully aware of the fact that he gets results through people, and if a student is to become a leader, he must be trained and motivated in his actions so that he is thoroughly appreciative of the fact that he gets results through people, and if a student is to become a leader, he must be trained and motivated in his actions so that he is thoroughly appreciative of the fact that his success will be built upon the results he will obtain through people. The student graduate must be fully trained in the foundations for good job relations. Industry is acquainted with its grave responsibilities to its workers and is even more deeply conscious of the fact that each person making up the work force must be treated as an individual. It is very apparent that many of the student graduates today are not cognizant of the fact that their success in becoming leaders in industry is dependent upon their full realization of the individuality of each person in the working force and that they must understand people—what motivates them, and how best to accomplish a successful industrial operation through the use of people. It is extremely important that each student have a basic understanding of human psychology; that he be well versed educationally and experience-wise in the foundations for good relations with workers; that he be taught and given experience in handling job relations' problems. In this connection of job relations, it is important to each educator to study what is being done with regard to this phase of a student's education. It is altogether possible that this essential quality of leadership is not being stressed to the extent it should be in the education of the student.

Another very pertinent quality which industry must have in the student graduate is the ability to instruct. A fine technical education is tremendously

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World Economics and The British Textile Industry

(Editor's Note)

Dr. John W. S. Hearle was born in Glouchester, England in 1926. He received a B.A. degree in 1947 and a M.A. degree in 1950 from St. John's College, Cambridge University, and a Ph.D. degree in 1952 from Manchester University. Dr. Hearle is at Clemson under an award by the State Department under the Smith-Mundt Act which is to enable foreign post-graduate students and faculty to study in the United States. He is engaged in research on the project for the use of electrostatic forces in the opening and cleaning of cotton.

I crossed the Atlantic at the same time as the Prime Minister, Winston Churchill; and as my taxi drove away from Pier 90, the driver asked "What is it going to cost America?" Although Europeans are grateful for the tremendous help which America has given them in rebuilding countries and economies shattered by war, they do not like the idea of becoming poor relations continually begging for help to get out of their difficulties. This type of relationship is not one which will make for strength in the free world—that will come when each nation can give freely of its best, and not feel that it is dependent on the bounty of some more prosperous ally.

With the present international economic position, there would seem to be three main possibilities:

(a) A continuation of American aid, which neither the giver nor the receiver find very pleasant.

(b) A reduction in dollar expenditure by soft currency nations. This would result in a lowering of their standard of living; a weakening of their defence effort; a tendency to separate from America and form a third world camp (and possibly some countries passing under Russian influence); and a loss of American overseas markets—for example, the British would probably economize first on imports of raw cotton,* tobacco, and films.

(c) Increased sales by foreign countries in the United States, enabling them to earn enough to satisfy their vital dollar needs. For this to happen some modification of American import and tariff policy seems necessary. At present the tendency is for protection of the American manufacturer whenever a foreign country starts to succeed in the American market. Fewer import restrictions* and lower tariffs would cause some loss to American manufacturers in the home market; but would result in lower prices to the American public (since the foreigner could not compete unless he was cheaper), and a continuation or increase, of overseas sales, without the dollars to pay for these coming from the pocket of the taxpayer. It would also result in a much more healthy relation between the nations of the free world. In the words of the British Chancellor of the Execheq−uer, we want "Trade, not aid." To do this we, in the countries which need dollars, must make a great effort ourselves to send more of our production into dollar markets.

How does Britian and the British textile industry fit into this picture? Following the war, Britian has been faced with the need to make a great economic effort. There are various reasons for this. During the 18 months of war, before Lend-Lease, Britian

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* Britian imports about $100,000,000 of cotton from the U.S.A., which is 1/5 of British consumption, and 4% of American production.

* Import restrictions serve essentially different purposes in debtor and creditor countries. In debtor countries they prevent the import of goods which the country has not got the foreign currency to pay for. In a creditor country they protect the home producer, but restrict the ability of debtor countries to earn anything with which to buy from the creditor country.

Warp Sizing

By Dr. Paul Seydel

(Editor's Note)

The contents of the following article are the major points of interest of a speech given by Dr. Paul Seydel to the National Textile Manufacturing Society at Clemson, February 17, 1953. Dr. Seydel is associated with the Seydel-Woolley and Company, Atlanta, Georgia.

In any discussion of sizing, we must keep foremost in our minds what the purpose is of warp sizing. It is not to produce a certain feel or a certain stiffness. It is not to give added weight or strength to the yarn or even to lay the fibers. It is purely and simply to obtain the best possible weaving. These other considerations contribute to good weaving, but will not produce it.

No one or two properties can be chosen as a basis for judging a yarn. Attempts have been made by practically everyone who has investigated the subject to relate yarn or size film tests to weaving efficiency. Certain work of the Textile Research Institute promises to give some indications of how the warp will behave in a weave room by correlating a number of different properties of the yarn and size films which may be tested in the laboratory. Yet even this work with its complicated relationships of many properties will not always give an accurate picture of weave room performance. The Shirley Textile Institute of Britian also has not been able to accurately predict weaving quality from laboratory tests. Recently the American Dyestuff Reporter contained a paper by the Rhode Island Section stating that laboratory tests could not be relied on to predict mill efficiency. So sizing is still more of an art than a science, although the scientific angle is being developed day by day, both here and in England.

A good warp size, well-handled on the slasher (and that is very important) should give increased tensile strength, flexibility, elasticity, good fiber-lay, smooth size film, and hygroscopicity. The last is a technical term meaning ability to attract moisture and hold it—therefore allowing weaving to be carried out at lower humidities, with attendant increased comfort to the weavers and less tendency to rust machinery parts.

Tensile strength has been used much in the past as a basis for judging a sized yarn, principally because it is easy to measure. Increase in tensile strength of sized yarns is due to a glueing together of the fibers of the yarn, so that they do not slip past each other. We can see this in breaking an unsized yarn — the break is uneven with unbroken fibers which have merely slipped and stick out. This is even more obvious if the yarn is first untwisted. A heavily sized warp will break almost square.

The effect of the film itself on increasing the strength is small, as the film strength is much less than the fiber strength—the individual cotton fibers are as strong as steel of the same size.

Then why not try to get as high a tensile strength as possible by getting good penetration and glueing together the fibers all the way to the center of the yarn? Well, this has been tried as fallacy number one. In the first place, the fibers go in and out from the center, so that most of them are glued at some place along their length even with a surface size. In the second place, if we get the size all the way in the center of the yarn we get a stiff rod-like quality, due to loss of flexibility. With all the bending that warp yarn must undergo—the changing of the shed and the bending around the filling yarns—the yarn must have flexibility.

With the solidly sized yarn, the effect would be much as the action of a solid rubber tire. It is obvious that a tube filled with elastic substance—in the case of the tire, air; and in the case of yarn, the cotton fibers—is much more resistant to shock as a result of its cushioning effect than a solid tube would be.

Besides the loss of cushioning effect, an excess of penetration will decrease the elasticity of the yarn, since size films generally are not elastic as the fibers. Elasticity is an absolutely necessary property in good weaving. No matter if the tensile strength is doubled, if the loom wants to stretch the yarn farther than its elastic limit, the yarn breaks — the loom is more powerful than the yarn.

Then we see that although increase in tensile strength is usually helpful, it should not be obtained at the expense of other important properties. The size film should penetrate just deep enough to give a good anchorage to the outside of the yarn, so that there will be little tendency to shed.

A flexible film is produced only by the proper combination of good sizing materials and good slashing. The size film must not be over-dried on the slasher.

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The Saco-Lowell Gwaltney Spinning Frame Story

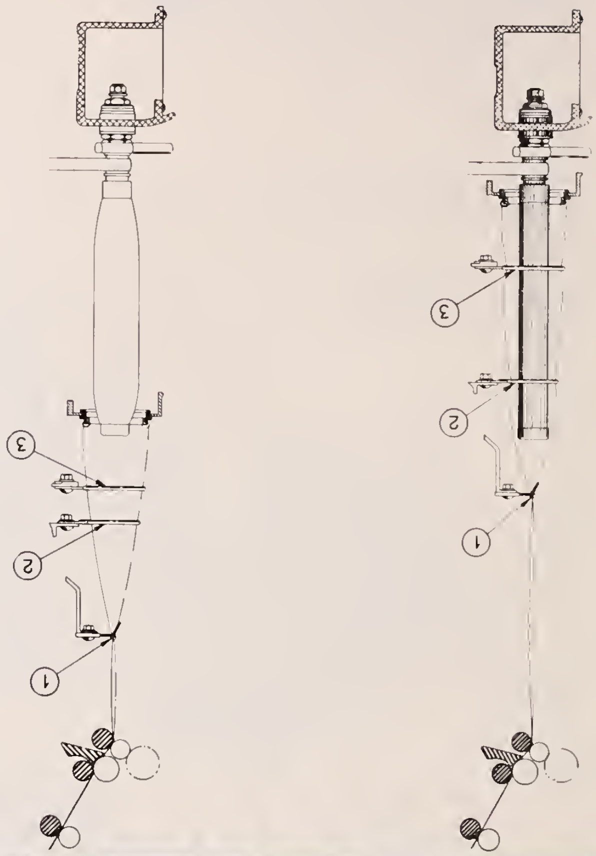
The Saco-Lowell Gwaltney Spinning Frame was given its first publication in 1952. Since that date almost 400 of these Gwaltney frames have been shipped to **over 30 mills.** The largest installation in operation at the present time consists of 65 frames at Ninety-Six Mills.

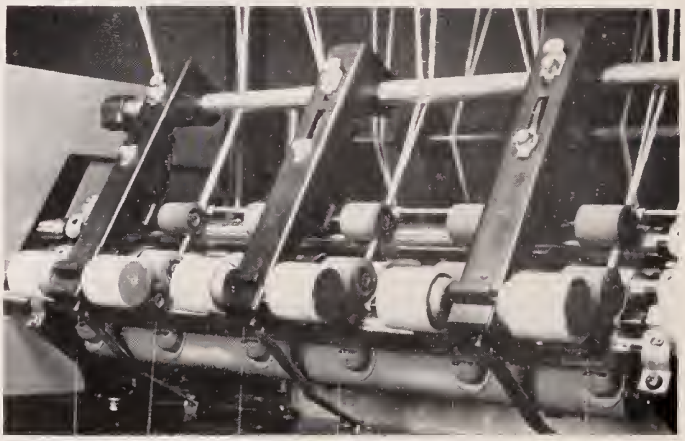
In offering this frame to the yarn manufacturing industry, the Saco-Lowell Shops were very careful to make no specific claims as to production, quality or economy of operation. They were specific in their statement that this was a brand new tool, original in design and conception, placed at the disposal of yarn manufacturers, and it was their responsibility to work out operating procedures which would assure the use of this new tool to their best advantage. This policy has worked out to the advantage of all concerned because it has placed the initiative in the hands of mill management who, in every instance, have obtained results in excess of their forecast and expectations.

In this frame are incorporated the most advanced sub-assemblies to produce the results demanded in the highly competitive textile market today. For example, there is a drafting element capable of handling staples ranging in length from 3/4" to 2-1/2" with drafts from 9.4 to 50.5. The New Era Spindle and vitritex rings will produce yarn packages weighing as much as 1 lb. The ring sizes vary from 2-1/2" to 3". All of these sub-assemblies are brought together on a brand new chassis which makes full use of the anti-node principle of spinning, illustrated in Figure 1. The distance from the tip of the front roll to the lowest position of the ring rail is 27-1/2", a construction made possible and practical by the use of the node rings 1, 2 and 3 in Figure 1.

On account of the distance which the yarn travels in going from the front roll to the bobbin, there develops a condition which brings about an equalization of the twist, a condition which is somewhat similar to that existing in a mule during the run-off and "backing" off cycle.

It is the ability of the Gwaltney frame to produce low twist yarns with low variation that makes it most useful to manufacturers of quality fabrics. Large creel packages in an accessible umbrella creel, the Pneumafil waste collecting system, an unusually broad use of anti-friction bearings in the head end in the top and botton roll system and other strategies, and simple gearing of completely new design all contribute to operating efficiency. Streamlined contours, lint-shedding finishes and overhead cleaners allow the spinner to devote her energy to more useful activities.





WARP SIZING

(continued from page eight)

We must remember that these starch films behave the same toward heat as they do in bread — bread once toasted will never again be flexible and elastic, no matter how much it is soaked. The films will soften true enough but their toughness and flexibility are lost forever.

The gums added to a size can greatly affect its elasticity and flexibility. By means of chemicals, using proper amounts under proper conditions, gums may be made from starches to duplicate the properties of practically all natural gums, with the additional advantages of uniformity, not to mention lower expense. These gums may be incorporated in the sizing compounds, and if desired, chemicals may be added to the compounds to alter the properties of the starch.

Air-dried films of pearl corn starch are smooth and fairly strong but have no flexibility and if bent, will break. A film of a corn starch which has been treated with certain chlorides has greater flexibility—the film may be folded as much as desired without damage. Such a film with this amount of chlorides would be too soft for use in sizing yarn. Many other chemicals, both organic and inorganic, may be made by adding more tallow to the corn starch than should have been used for good sizing. The effect of the tallow is that a discontinuous film is produced, obviously of no value for sizing. Tallow used alone in size always produces this effect, which is very familiar to anyone who likes shortening bread. Crumbly biscuits and pie crusts are made in the same way — by using more shortening than usual, decreasing the continuity of the cooked starch mix. The same chemical—starch—is the basis for both bread and size.

The reason that we do not use materials that make the size film as flexible as possible is that generally flexibility is produced at the expense of hardness. Although hardness as such is not a particular desirable characteristic, the film must be hard enough to produce a smooth surface—even more important, it must be a film that is not easily pushed about on the surface of the yarns to produce a soft warp or balling up in the harnesses and drop wires. The same consideration may be applied to any attempt to get the elasticity as high as possible.

The smoothness of the film may be obtained by use of lubricants or by making a hard film, with not too much softener. There are some materials that must be particularly avoided. During the last war, we ran across numerous "starch substitutes," and "starch extenders," some of which contained low-grade clays. In a short length of time, some of these materials wore into the reeds, and in many cases, harness eyes

(continued on page twenty-one)

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Research Opportunities for Textile Students

Dr. Edward A. Murray

Biographical Sketch

Edward A. Murray is a native of Tacoma, Washington and graduated from the University of Washington in 1938 in chemical engineering. After three years at Oregon State College as an instructor in chemical engineering, he went to The University of Texas for further graduate studies and received the Ph.D. in chemical engineering in 1946. During the war years, he was group leader in the Research Division of the National Cotton Council, in charge of a project on the application of high polymers to cotton prior to spinning. From April 1946 until October 1952, he was connected with the Deering Milliken Research Trust, and during the last four years of this period, served as Director for Chemical Research. He is now engaged in consulting in textile research and development, and is associated with the Clemson Textile Department on a part-time basis conducting research on small-scale finishing tests for cotton.

Although college courses in textile are not usually considered as the ideal training for would-be research men, there is today a new opportunity in the field for men of creative minds with practical training in textile operations. All industries today are expanding their research efforts, and in these days of technical manpower shortage, the competition for personnel has driven the salary scale for research workers very sharply upward. The textile business, hardly a research-created industry, is beginning to adopt some of the methods which have placed this country foremost in chemical, metallurgical, petroleum and other fields, and the demand for researchers in textiles is probably at least as great today as it is in other industries.

In order to discuss textile research with some degree of intelligence—no one, least of all the research man, seems to understand the textile business completely—it is perhaps best to start with a definition or two. Research may be defined as the application of the scientific method in an investigation having as its objective the revision of accepted conclusions in the light of newly discovered facts. The scientific method, according to the late Thomas Midgley, is characterized by the reproducible experiment, all of the variables such as temperature, time, concentration, and the like, being controlled so as to yield a result which can be exactly repeated tomorrow, next month, or five hundred years hence. Research is of many types, and it is difficult to classify them. For our purpose, the difference between fundamental and applied (or industrial) research can best be understood if we make use of an executive's opening statement in proposing a new project. In the first case, it would probably be, "Let's find some new data," and in the second, "Let's find some new dollars."

Practically all of the fundamental research on fiber, yarn and fabric is, at present, conducted in laboratories of research foundations such as the Institute of Textile Technology at Charlottesville, Virginia, the Textile Research Institute at Princeton, New Jersey, the various government laboratories, or in the fundamental research divisions of major suppliers of synthetic fibers. Textile mills, in general, have found that fundamental research, with its long waiting period for results which can be converted into dollars, is not well fitted to an operation where dame fashion rules the roost, and with few exceptions, research in the textile industry itself has been of a strictly applied character. Because the industry is highly competitive, and production schedules can change overnight, much of the research in textile product development goes on in an atmosphere similar to that in the emergency room of a hospital. The patient needs quick treatment if he is going to live. It is unfortunate, but true, that the buying public does not always demand the best values in textile products —this leads to wasted, or at least non-constructive, efforts in development laboratories where activities are largely governed by market demands. A manufacturer who fails to satisfy the customer will not remain long in business, so researchers should not blame the production man for his attitude, and must adapt their own thinking to fit the needs of the whimsical consumer (mostly female, of course.) There is a degree of frustration in trying to make a fabric out of that new miracle fiber from coal, air and water, when the lab reports show that one or another of the old fibers is really better, and this has become an almost everyday headache in textile development laboratories. But mills are always faced with adapting operations to the handling of materials that will bring in the greatest profit per loom week, and the new fibers are usually most profitable. Whether the demand will be there next season is of secondary importance. The clash of one synthetic on another is heard in every remote corner of the textile manufacturing empire with strong hints, as we find new announcements in the trade literature of additions to an already confusing array, that the battle is only getting under way The chance that an orderly situation will be established by the

(continued on page fourteen)

Placement Work of The Textile School

Dr. Hugh M. Brown
Dean, School of Textiles

This is to outline the placement work being carried on by the Textile School. Since the war the following services have been provided:

1. Before each graduate period a folder is made up for each graduate containing all his grades by subjects, his grade point ratio, a summary of his confidential personality record, his picture and a form filled in by the student giving his outside activities and job preferences.

This folder may be studied by any prospective employer coming to Clemson to either interview or inquire about students.

2. The school, through the Dean's office, arranges with company personnel for interviews with all intersted seniors. Notices are posted concerning every request for men and interview schedules are set up for all the prospective graduates interested in each company. Group interviews are arranged when requested if the number of interested seniors justify them.
3. For companies not wishing to send personnel representatives for interviewing, notices of the openings are posted and lists of interested seniors are sent by mail along with summaries of the personnel records and grade point ratios. Additional information including transcripts of credits on any student may be had on request.
4. When requested, arrangements are made for personnel representatives to talk with the student's professors concerning his ability and personality.
5. When requested by companies, trips are arranged for students to visit plants and meet company personnel.
6. A file of names of former graduates wishing information on openings is kept in the Dean's office and a list of recent openings is sent to each former student wishing to make a change. Such students should write giving a statement on the types of openings he would consider. He may review the total list of openings by coming to the office.
7. All company requests for men with experience are promptly answered with a list of the names of all such men who have recently requested

(continued on next page)

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PLACEMENT WORK OF THE SCHOOL OF TEXTILES

(continued from page thirteen)

work similar to the position to be filled. Companies having such openings may list them with the school briefly outlining the positions.

It should be realized that ever since the war there has not been nearly sufficient graduates to fill all requests for men. This has been especially true during the period of the Korean conflict when so many graduates have to enter Military service. There now, however, are an increasing number of graduates completing their period of service and looking for openings in the industry.

In addition to placing graduates the school seeks to place as many undergraduates as possible in summer work during their sophomore and junior years. This sort of work is very helpful in the students training, fitting them for more rapid advance in the industry after graduation.

RESEARCH OPPORTUNITIES FOR TEXTILE STUDENTS

(continued from page twelve)

scientific method is remote; like most developments in the industry, each fiber will find its own place, but only through the slow evolutionary process which is characteristic of the business. With consumers becoming increasingly critical, there is reason to suppose that competition in the immediate future will be stiffer than ever, and in an industry which can overproduce very quickly with existing plant capacity, it seems reasonable to assume some mills will be forced out of business. In such a competitive situation as this one, research at the mill level may very well spell the difference between business success and failure.

Does all of this indicate that the opportunities in applied textile research may be limited? Quite to the contrary; if mills are to run the fabrics in current demand, or to produce the old ones at competitive prices, a fresh approach to manufacturing problems and a scientific one, is an absolute necessity. The opportunity in the textile manufacturing industry for applied research men was never greater than it is today.

Still another great potential for productive applied research along textile lines exists in the laboratories of the chemical companies and machinery suppliers. Many chemical companies, not yet manufacturing textile chemicals, are eyeing this market with more than casual interest. It is difficult for them to break into this business quickly, because the industry is so highly specialized and textile mill requirements in raw materials and machinery are, in many cases, quite different from those of customers in other industries. The needs of a textile mill are best understood by those who have had first-hand experience; a degree in textiles is good, and manufacturing experience even better. With additional graduate training in research methods, the graduate in textile chemistry should be able to provide the key to this problem for a considerable segment of the chemical industry. Equipment manufacturers, particularly those who are now in the textile machinery game, are finding it profitable to use textile engineers in development work.

The current shortage of technical manpower for research has created today a seller's market among practically all of the graduating seniors in the class of 1953. The picture seems to be darker (or brighter, depending upon whether one views the situation from the standpoint of the personnel department or the applicant); research workers have never been more in demand and shorter in supply and all indications are that the shortage will not be over for some years to come. The textile graduate today may capitalize on research opportunities which did not exist a few years ago.

Through specialized training for research does not insure a successful career, it does come in handy from time to time, and it usually enhances the chances for a rise to the top of the ladder. A few years ago, it would have been impossible for a textile graduate to equip himself for a research career without an additional two or three years of undergraduate training in one of the sciences as well. Today, a number of textile schools offer graduate training and the Institute of Textile Technology also grants advanced degrees after two years of successfully-completed graduate training to outstanding textile students who are interested in laying the foundation for a research career. In such institutions, research methods are competently taught by men who have had long experience in the field, and the graduate training more than pays for itself through more rapid professional progress on the job.

Opportunity is usually greatest where security is least. The final decision on research in the textile industry will probably never be reached. Management will certainly minimize the expense of development or even discontinue development work if it cannot produce a profit. The challenge is an immediate one; if we don't get results today, we won't be here tomorrow. The potential rewards, however, are all that could be desired, and then some. If one has a leaning toward tackling insoluble problems, producing positive results in an impossibly short space of time, and a philosophical acceptance of ninety-five per cent failure, research in textiles is indeed the greatest opportunity of our generation.

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PHI PSI NEWS

By Arthur B. Swett

Iota Chapter wishes to welcome three new members to the ever-growing ranks of the fraternity. These are: Heyward C. Hurt, a TC major from Greenwood, S. C.; Joe F. Mattison, a TC major from Belton, S. C.; and Max U. Gainor, a TE major from Lancaster, S. C. These candidates met all the chapter requirements and completed the third degree on April 13.

In keeping with the objective of maintaining high standards and scholarship throughout the fraternity, it is Iota's policy to pledge the sophomore with the highest scholastic average for each semester, and to pledge juniors and seniors with a grade point ratio of at least 2.6 and 2.3 respectively. This is based upon a "4" grade point system. We feel that this policy encourages scholarship among Clemson textile students and insures a good, all-round reputation for the chapter. These facts are mentioned because we wish other chapters and interested persons to know how Clemson Phi Psi men are chosen.

The "Orchids of the Month," along with this chapter and the whole textile school's congratulations, goes to Marvin C. Robinson of Asheville, N. C., who has accepted a scholarship to the Institute of Textile Technology at Charlottesville, Virginia. This is quite an accomplishment since the enrollment of the Institute is made up of a very limited number of outstanding textile students. Marvin has three letters in basketball to his credit, is a member of the Block "C" Club, and is active in the Clemson Blue Key Organization. You will also find his name listed in "Who's Who In American Colleges." He plans to enter the Institute soon after graduation in June.

The Annual Banquet for Iota Chapter will be held May 1 in the "Cotton Room" of the Greenville Hotel in Greenville, S. C.

MEMBERS OF THE PHI PSI FRATENRNITY

Front row: Senior Warden J. T. Messer, R. L. Blackwell, President B. E. Wilson, Jr. Warden B. K. Chreitzberg, E. J. Gilliland, W. C. Compton, R. V. Smith, J. C. Crumpton, J. J. Popalos, A. B. Hair. Second row: Secretary-treasurer, A. B. Swett, Faculty Adviser T. A. Hendricks, F. M. Welsh, Executive Secretary of the Grand Council J. T. Wigington, C. R. Mabry, T. E. Wessinger, H. E. Bradberry, J. R. Kiser, R. A. Gallucci, and F. L. Wickham.

An original, fundamental research on "Vat Dyeing on Orlon, Dacron-Orlon-Wool, and Dacron-Wool Blends" of considerable value and success was recently completed by one of our brothers, Fitxhugh L. Wickham, and a fellow student, Paul R. Robinette. These two textile chemistry majors presented their paper before the Piedmont Section of the AATCC and won first place. The research paper will also be entered in the contest at the National Convention of the AATCC at Chicago in September.

Along with this subject of textile chemistry we would like to mention that two of our members, Fitzhugh Wickham and William P. Creighton, are active members of the Alpha Chi Sigma Fraternity. This is an honorary chemists' fraternity with nation wide recognition. Around our campus these two "Brothers of the Test Tube" have made themselves well known among the students.

Clemson's representative to the National Convention in Philadelphia in May will be Bennette E. Wilson, a textile engineering major from Spartanburg, S. C. Ben is President of Iota Chapter and Editor of the "Bobbin and Beaker." We, of the Clemson Chapter, are sure that you who attend the convention will find Ben a fine and interesting person, and hope that you will enjoy working with him as much as we have.

We were all saddened at the recent death of our faculty advisor, Prof. W. G. Blair. "Pop", as he was affectionately known to all students, gave abundantly of his time for many years for Phi Psi generally, and Iota Chapter in particular. He was well known throughout the whole textile industry and his untimely passing leaves a gap that will be hard to fill.

INDUSTRY AND THE STUDENT GRADUATE

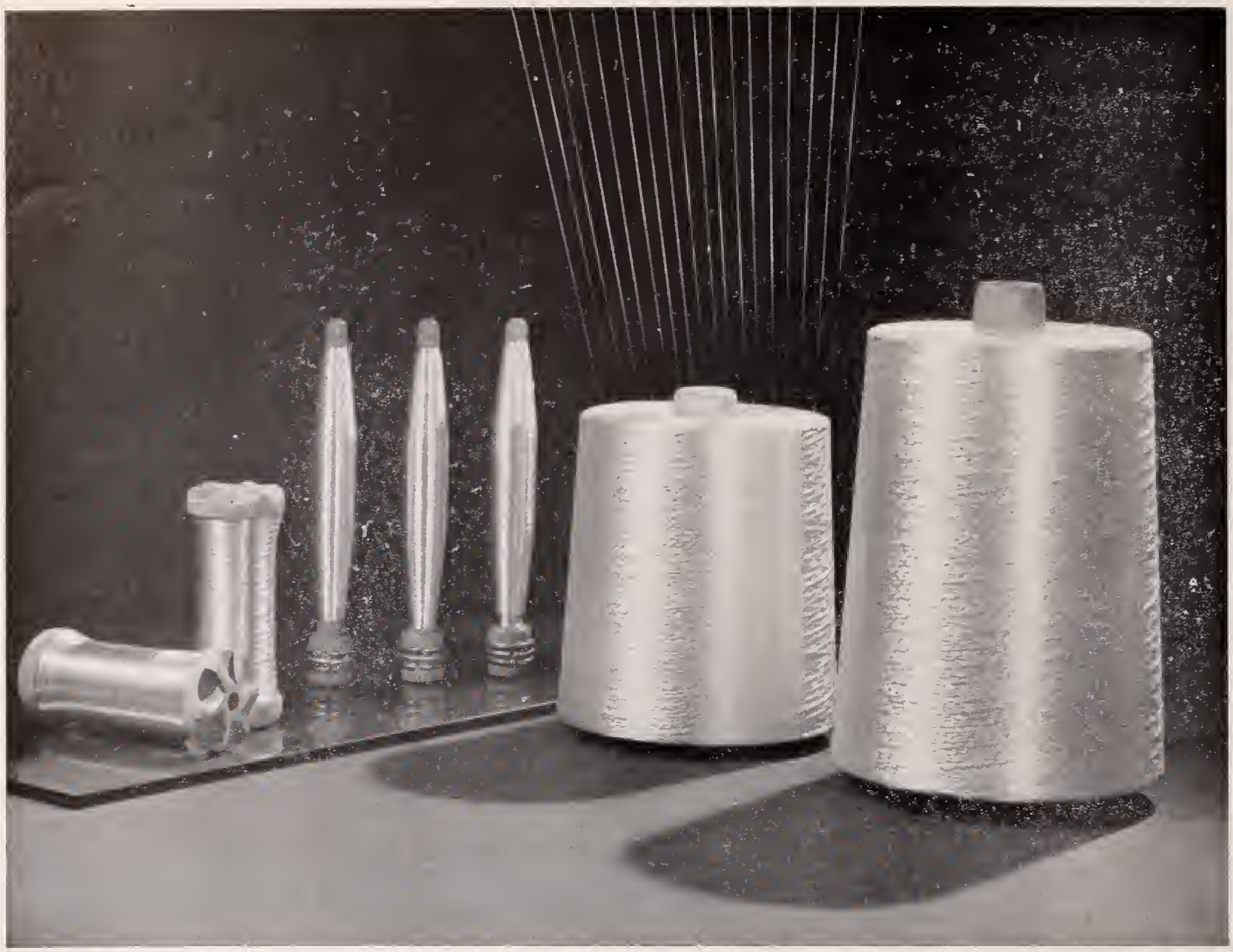
(continued from page six)

important; however, let me emphasize the fact that unless the student has the ability to impart instruction to people he cannot succeed as a leader in industry. As previously mentioned, the first objective of the student graduate is to become a supervisor, and as such, he will have the responsibility of obtaining results through people, and they, in turn, must be instructed to obtain results. They must know how to do the job; this entails instruction. Instructing is not a haphazard practice. It requires detailed planning, understanding of the person to be instructed, knowledge of the subject, and proven procedures to be followed in order that the instructing job may be done most efficiently in a minimum of time. It may be quite definitely stated that if a worker hasn't learned, the instructor hasn't taught. And this rather important statement expresses the importance of the definite need of the student to be fully qualified to instruct those workers whom he has been entrusted to supervise.

The student graduate, to whom we are looking to become a leader in industry, will always be faced with the prime responsibility of obtaining the maximum production possible of the highest quality at the lowest cost. This, of course, requires the greatest technical skill, but even more important it requires the basic ability to get results through people and to to be able to instruct them.

How many of our educators really know intimately the problems of a supervisor in industry? It is of the greatest importance that they do know. The supervisor's task is one of tremendous complexity. His responsibilities are many. They include the responsibilities for production, quality, costs, safety, good job relations, instructing new employees, labor turnover, health, and a whole host of other very important duties. In order to carry out these obligations, the supervisor must have a vast knowledge and certainly a foundation of experience. It is vital that knowledge and experience be imparted to the student to equip him to enter industry and adequately cope with these responsibilities. Regardless of the industry which the student enters, the basic responsibility will be the same. Although individual industries and companies may have different policies, practices, and procedures, the problem of understanding people, treating them as individuals, obtaining good job relations, and the ability to instruct workers is the same.

The educators of our students have a tremendous responsibility—first, to understand fully and completely the problems of industry; secondly, to make mandatory the inclusion in the curriculum of the student courses of study and discussion which will equip the student with knowledge and experience in working with people. The students of today will be the leaders of industry tomorrow, and as such, they will be far better prepared to meet their responsibilities if they understand human relations and methods of instruction. Industry stands ready today to supply the facts and the day-to-day problems which the student will encounter when he enters industry. The educator's duty is to get these facts, know and understand the problems, and produce a student graduate fully equipped to cope with these responsibilities.



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WORLD ECONOMICS AND THE BRITISH TEXTILE INDUSTRY

(continued from page seven)

used up almost all her gold and dollar reserves* buying the weapons with which to fight: These were the savings accumulated during the prosperity of the 19th century; and their loss has two effects—there is no interest coming in, and, more seriously, whenever there is any economic set-back our reserves are perilously low. And Britian must import to live—we have a population of 50,000,000 (24 times that of South Carolina) in an era only three times that of South Carolina; and, although British agriculture produces a high yield, we cannot produce enough in that area to satisfy our needs. Another factor involved is the increased competition in many of our traditional export industries. For example, at one time, our biggest export was textile goods, mainly in cheap cloth for Africa and the East; but we now have to compete with production in Eastern countries having cheap labor, with U.S. mass-production for a huge home-market, and with increased production in countries anxious to supply their own home-markets.

Since Britian has only a moderate home-market, only a limited supply of raw materials, and has not got the advantage of cheap labor or cheap power, and must transport her imports and exports over long distances, her best hope for the future lies not in mass-production but in quality production. Britian will have to concentrate on products needing the maximum of skill and the minimum of raw materials and power. A good example is the Comet jet airliner—the fastest and finest air-liner today—designed and made by the De Haviland Company in England.

The British textile industry suffers particularly from the difficulties facing the British economy. Built up during the nineteenth century to supply a cheap mass foreign market, it is now left with old machinery and crowded mills, facing increased competition without the flexibility of a new and expanding industry. But, although some mills still have a backward attitude (in good times saying "we do not need to re-equip" and in bad times saying "we cannot afford to") the majority are facing these problems, introducing new methods, and adapting their production to present-day needs.

Some facts and figures may be of interest. The British cotton industry employs a labor force of 320,00, of whom about 60% are women; and produces about 25,000,000 lbs. of yarn, and 60,000,000 yards of cloth per week. The woolen and worsted industries employ about 200,000; producing 45,000,000 lbs. of yarn and 35,000,000 sq. yards of cloth per week. The rayon industry produces about 10,000,000 lbs. of yarn per week. The industry is almost entirely horizontally organized, and is concentrated in a small area: almost the whole cotton industry lies within an area 30 miles long and 20 miles wide in Lancashire, and within this area the various towns specialize in particular types of work — e.g., fine spinnings, coarse spinning, weaving, etc., with Manchester as the commercial center of the industry. The wool and worsted industry is similarly concentrated in Yorkshire, centered on Leeds and Bradford.

Except in the field of synthetic fiber production, the British textile industry is made up of a large number of small firms: 20% of employees are in units employing less than 100, 55% in units of 100-500, and 25% in units bigger than 500. There has been no tendency to amalgamate into industrial mammoths. But realizing that competition against external forces is more important than internal competion between different firms, the industry has done much in cooperative research and education to improve its efficiency. This effort takes various forms. First there are Government bodies such as the Cotton Board, which concerns itself with industrial efficiency and the economic position of the industry, more than with technical detail.

Secondly, there are nine Research Associations—for wool, cotton, linen, jut, rayon, hosiery and knitting, felt and hat-making, lace, and laundry. Financed partly by the industry and partly by the Government, they are controlled by Boards elected by the member firms. The research which they do varies from pure science, such as the work on partition chromatography, carried out at the Wool I.R.A.,

(continued on next page)

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* British gold reserves were reduced from 2,690 million dollars in 1938 to 1 million dollars in 1940. Our remaining dollar reserves were mainly in U.S. investments owned by British citizens; these were not all readily marketable, though about $400,000,000 worth (including such holdings as the British ownership of American Viscose Corporation) were requisitioned and sold.

for which A. J. P. Martin and R. L. Synge were awarded the Nobel prize in chemistry last year; to an immediately practical problem such as the adaptation of an instrument to measure the moisture in cakes of viscose rayon. The largest of these is the British Cotton Industry Research Association (The Shirley Institute) which has a total staff of nearly 500, about 1/4 graduates, and an annual income of $700,000[*]. The only field which the Research Associations avoid is that of political and industrial controversy; but even there they try to provide the facts on which such matters as wage rates can be fixed. In addition to doing the research they have to see that the results reach their members in a form which they can use. This is done partly by publication and partly by the personal activities of the liaison staff.

Thirdly there are the Textile Departments of the Universities (financed jointly by Government, local authority, industry, endowments, and fees, but largely independent in administration and policy) and Technical Colleges (controlled by the local authorities.) These produce fewer graduates than American Textile Schools (which is characteristic of the British educational system), but they are supplemented by a large number of those working in the industry who take part-time Courses, mainly in the evenings. The Universities of Manchester and Leeds, the former biased towards cotton, the latter towards wool, offer courses in Textile Technology for the degrees of B.Sc. Tech., M.Sc. Tech., and Ph.D.; and several of the Technical Colleges also offer full-time courses — in particular, Nottingham and Leicester serve the needs of the hosiery and knitting industry. In addition to teaching, the Universities do research (mainly financed out of their general income, but in some cases by grants for special purposes.) For example, at Manchester, we have W. E. Morton's work on yarn structure, on spinning quality of cotton, and on other subjects; P. H. Walker's development of a yarn irregularity tester; my own work on the electrical resistance of fibers; work on braided structures; on the measurement of forces in spinning by means of piezo-electric crystals; comparative studies on the arealometer; and on methods of strength testing of cloth.

Fourthly there are Societies designed to further the needs of the industry, and to spread knowledge among their members. Foremost among these are the Textile Institute and the Society of Dyers and Colourists.

There is thus a considerable background of research and information available for the British textile industry; but to be of use it must be matched by action in the mills. Considerable improvements have taken place (many of the criticisms made in the recent report of the American team which toured the British textile industry 18 months ago would not hold so strongly today), but there remains a very wide range of efficiency in different mills. There are two particular weaknesses, which are characteristic of much of British industry. Firstly, although there is probably more and better fundamental textile research done in Britian than anywhere else in the world, the practical application to the industry is slower and less efficient than it should be. For instance, the British discovered fiber, Terylene (Dacron), went into production in the U.S.A., sooner than it did in Britian. Secondly, there is the need to think out the whole economic position, to decide what form of production is best suited to the position of Britian in the world today, and then to bring in the necessary changes. This is immensely difficult, particularly in a country set in its ways, since it involves radical changes both in the capital structure (the factories and machines) and in the ways and places of life of many people.

However, with the solid basis of the work in the research organizations; with an increased amount of education in the industry; with a more adventurous spirit in management; and with both employers and trade unions realizing as they have shown by their responsible leadership in recent years, that their prosperity lies not in fighting one another but in working together to improve the efficiency of the industry; I feel sure that the British textile industry will adapt itself to the changed circumstances, and will continue to contribute to Britian's economy, helping her to bring about a new financial stability, so that she can play an unfettered part in the free world.

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[*] At the official rate of exchange. In terms of wages and prices it is probably worth about $1,400,000.

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WARP SIZING

(continued from page eleven)

were cut clear through in a week or so of using these abrasive materials.

The quality of hygroscopicity is desirable only to a certain limit. The ability of a size film to hold moisture will go a long way to prevent troubles from over-drying or toasting the films. It will allow use of lower humidities in the weave room, giving increased strength and flexibility due to the extra moisture in the yarn. It may also be carried too far, however, as too much of a hygroscopic agent will hold so much water that a soft film will be obtained, resulting in the dreaded "soft warps." A film of this nature is liable to be gummy and sticky as well.

Hardness of the film can be tested on laboratory prepared film by a gadget known as the Sward Hardness Rocker. The rocker is set on a film so that it will begin to rock, much like a rocking chair. The number of swings it makes before it stops is a measure of the hardness of the film—It rocks more easily on a smooth hard surface than on a soft, yielding surface. The Textile Research Institute has shown by such tests that films that are either too hard or too soft will not weave well. The former are probably too brittle and the latter not strong enough.

No one particular property can be used as a basis for determining the weavability of a warp. For best results, each property must be balanced with the others.

Since literally millions of yards of cloth sized with chlorides (which are used by most of the larger size compound manufacturers) are finished each month without complaints, it hardly seems necessary to defend these useful materials. There still exists, however, some feeling against their use. Research conducted by the author at the Georgia Institute of Technology under the supervision of Dr. Harold Bunger and Professor C. A. Jones showed no damage to yarn sized with zinc and calcium chloride. On drying these yarns with even more heat and for a longer time than is normally done in finishing, it was found that the strength of yarns sized with chlorides to be actually greater than those which did not contain these compounds. It is believed that this increase is due to the water-attracting powers of the chlorides, which hold more moisture to the yarn, thus giving it a higher breaking strength. At least no tendering effect was indicated.

Probably the origin of the prejudice against chlorides came from some troubles that arose many years ago when hot-calendaring cloth containing high percentages of magnesium chloride which is much less stable than the chlorides in use today. Calcium and zinc chlorides are stable much above a temperature that would be sufficient to char the cloth.

The necessity for fiber-laying is obvious to anyone who has seen break-outs due to tangled ends in a loom. Efficient fiber-laying is accomplished by use of the proper materials to give good adhesive qualities to the size film.

The merits of a size compound cannot be judged by a chemical analysis. Analysis is a valuable check on uniformity, but beyond that the ordinary analysis does not go.

A good size compound should contain gums, lubricants, and softeners. The properties of these materials should be properly balanced to give the desired effect in sizing.

The reason most sizing compounds contain more or less water is that the gums they contain must be maintained in a more or less soluble state. Once the gums have dried out, they are very difficult to get back into solution, unless spread in the very thin films in which they occur on the sized yarns. Even then, gums derived from starch products may need enzymes or chemicals for their solution. Also the preparation of many of these materials requires water for the chemical reaction—the reaction will proceed only in solution. It would cost more to remove the water than would be saved in freight charges.

A 4% solution of locust bean gum is so stiff that it will not flow. It has little adhesive qualities. Its principal use is as a thickener, where viscosity is required, particularly in printing pastes. Sometimes too, greater viscosity is desirable in sizing, in order to pick up more size at the same concentration of solids in the size.

Gums are produced from chemically treated starch One of the greatest advantages of starch gums is that they may be prepared to give a certain viscosity at any concentration desired. Many of the natural gums cannot be put into as concentrated solutions as are normally desired for sizing purposes. An important factor is the ability to vary the adhesive properties of the gum. Certain viscosity starch gums give films that are too sticky for sizing use, and would probably ball-up behind the reed and gum the harnesses.

The man that prepares the size should know something about the over-all effect that a gum produces on his mix—whether it gives the proper viscosity, the proper amount of adhesiveness to lay fibers without gumming; the proper flexibility of finished size film, etc. Experience is the most valuable factor in determining this, and a good man in the slasher room can still do as well, sometimes better than the chemist in the laboratory. The chemist has principally the advantage that when he finds out what is wrong, he knows in what direction to move to vary the properties the way he wants them. The weave

(continued on page twenty-three)

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TEXTILE PRINTERS–DYERS & FINISHERS

WARP SIZING

(continued from page twenty-one)

room is still the ultimate test.

Another group of materials that is checked in every analysis is the so-called "fats." This term has come to include in the minds of people using textile chemicals, not only the pure fats but also the many varieties of oils, waxes, and synthetic materials having lubricating or softening properties.

Lubricating and softening are not all the same thing, but may often be confused because most fats serve both purposes. However, it must be remembered that the properties vary considerably from one fat to another. Sulfonated fats are good softeners but poor lubricants; mineral fats are much better lubricants, but not nearly as good for softeners. Pure beef tallow has some of both qualities, but is not ideal from either standpoint. Blends of other fats often surpass tallow in both properties, sometimes at a cheaper cost. Tallow owes its position to the fact that it was one of the most readily available fats in the days when sizing began.

In analysis, fats are generally divided in to saponifiable and unsaponifiable fats. Although many persons judge the effectiveness of a size by the amount of saponifiable fats it contains, both kinds vary immensely in properties and cost. We have tallow which can be either high grade edible or low grade inedible—a normal analysis will not indicate the difference. We have stearic acid and oleic acid, one a solid, the other liquid. We have fish oil, which is a very sticky oil, of no use at all for lubrication, and we have a synthetic fatty ester, which is claimed to have four times the lubricating value of tallow. We have a sulfonated product which has excellent softening properties. Japan wax is familiar to all. Textile soap and ordinary soap—all these materials show up in a chemical analysis as "saponifiable fats," yet their properties differ greatly.

In addition, there are partially saponifiable fats such as Carnauba, Candelilli, bees' waxes, and cotton wax. Part of each of these show up in an analysis as saponifiable fats, part as unsaponifiable fats. Linseed oil too, is a saponfiable fat, but one which will dry out on exposure to air to form an insoluble film—definitely not desirable on sized yarns.

Among the "unsaponifiable fats," we have in addition to the unsaponifiable portions of Carnauba, Candelilla, cotton wax, and others, the mineral products; paraffin oil, kerosene, petrolatum, various paraffin waxes each having different lubricating properties and softening effects. Cetyl alcohol, although unsaponifiable, is used to make high-grade emulsions, showing that lack of saponifying ability is no basis for judging emulsifying properties. Mineral products, properly blended with emulsifying agents, can be as emulsifiable as any saponifiable material. Generally spots from mineral oils come from non-emulsified oils dropping from machinery bearings containing dirt and fine metal particles. Although the oils themselves may be easily scrubbed out, the dirt and metal particles are not. Properly handled, mineral oils have never given trouble.

TEXTILE MEN RECEIVE AWARDS ON SCHOLARSHIP RECOGNITION DAY

The following men were honored on scholarship recognition day, May 6, 1953. Allston T. Mitchell of Greenville, S. C., was awarded the Fiberglas Junior Scholarship, in the amount of $600. Mr. Mitchell is a double major in Textile Engineering and Manufacturing. Marvin C. Robinson, Textile Engineer from Asheville, N. C., received a $1125 fellowship to the Institute of Textile Technology. The American Association of Textile Chemists and Colorists Award went to William P. Creighton, Textile Chemistry and Dyeing major from McCormick, S. C. Mr. Robert M. Cook, Textile Engineering major from Aiken, S. C., received the June National Association of Cotton Manufacturers Medal. Mr. Leonard G. Boyd, Textile Manufacturing major from Manson, Iowa, received the February National Association of Cotton Manufacturers Medal, The American Association of Textile Technologist Award and the Phi Psi Award.

PLEASE!

Help us to keep our files up to date. Our sincere THANKS to all of you who answered our appeal in the last issue. If you haven't answered, please fill in the form below and mail to:

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Woodside Mills *

* See Previous Issues

Where are they now . . . ?

B. E. Wilson, T.E. '54

Clemson graduates finishing in June will find that they are not alone. Everywhere they go they will find some Clemson men. If you are joining the Dan River Mills Inc., you will find Robert C. Smith, Trainee Mfg.; David Campbell, Trainee Riverside Mfg.; David Crawford, Trainee Riverside Mfg.

Also, Edward Baker, Secondhand Trainee, Carding; John Brooks, Overseer, Dyeing; William Brown, Overseer, Designing; Joe Davis, Overseer, Weaving; Glenn Gambrell, Overseer, Carding; Andrew Gregory, Utility Superintendent; Donald Hill, Overseer, Carding; and Frank Jones, Overseer, Carding and Spinning.

Also, Thomas Klugh, Technical Advisor, Mfg.; John Richburg, Designing Engineer; Herbert Stroud, Design and Mfg. Liaison; Robert Hawkins, Trainee Mfg.; Robert Gettys, Secondhand, Trainee, Mfg.; A. K. Ball, Superintendent of Weaving; J. E. Chappell, Superintendent of Finishing Mill; W. D. Vincent, Assist. to General Superintendent; J. Lamar Moore, Maintenance Overseer, Carding; Furman League, Overseer Weaving; and John J. McCarthy, Technical Advisor.

Vicara® loves everybody!

ZEIN FIBER

You heard us! Sure-as-spinning, *Vicara* is wild about wool, nuts about nylon, coos over cotton, raves about rayon, "oohs" and "ahs" over ORLON[1] and ACRILAN[2] thinks DACRON[3] and Dynel are simply divine!

Vicara loves every fiber—because *Vicara* blends with any fiber to make a better fabric. *Vicara* is the fiber that improves the blend—any blend and every blend.

Maybe you've got a blend on *your* brain—a blend that's got possibilities, but's missing something. Something like luxurious softness or moisture absorption. Or maybe the wrinkles won't hang out.

If this is sad but true, then *Vicara* is the baby for your blend! In addition to soft luxury and glorious comfort, *Vicara* is completely washable, resists moths and mildew—and possesses the rare ability among man-made fibers to dissipate static.

Vicara has an impressive collection of Success Stories—in shirts, dresses and suits, blankets, socks and sportswear. It's too bad that there's not more *Vicara*—because *Vicara* loves everybody and has so much to contribute to every blend!

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[1] DuPont's trademark for its acrylic fiber.
[2] Chemstrand's trademark for its acrylic fiber.
[3] DuPont's trademark for its polyester fiber.

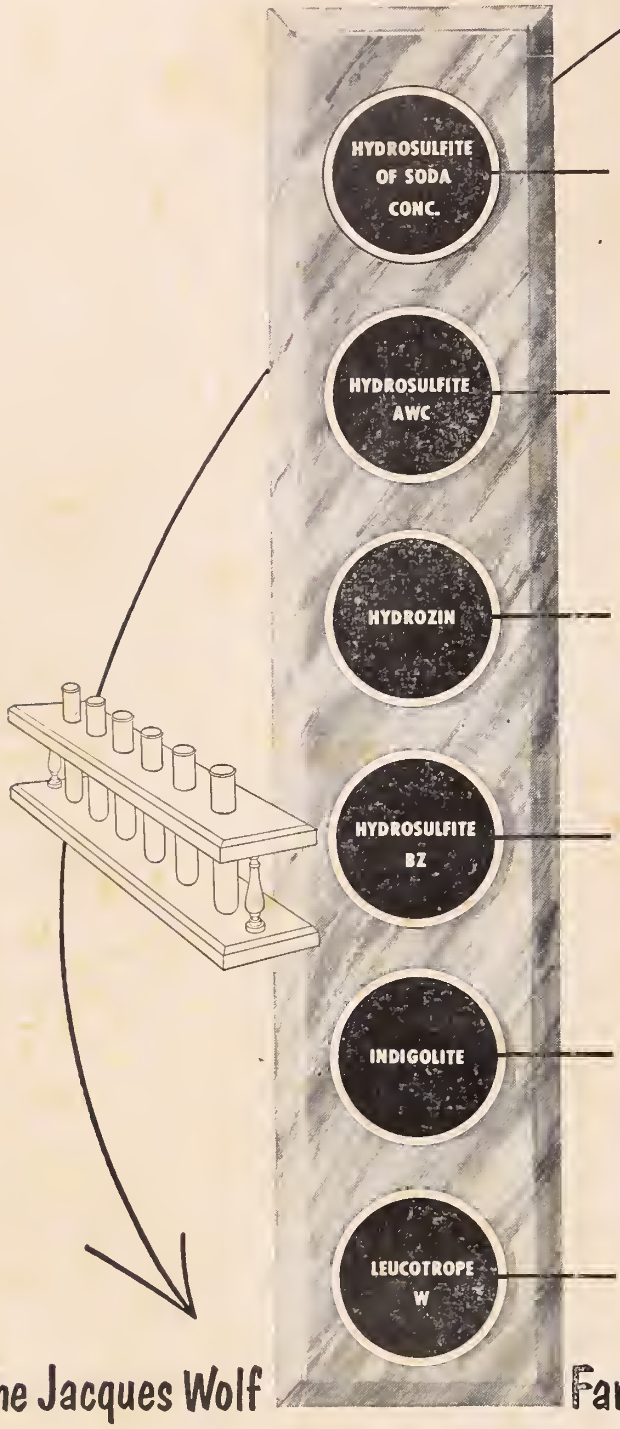
Vicara®

THE FIBER THAT IMPROVES THE BLEND

UNIFORMITY • BEAUTY • VERSATILITY • ECONOMY • EASE IN USE • SPINNABILITY
DYE-ABILITY • WARMTH • HANDLE, FEEL AND DRAPE • ELASTICITY • RESILIENCE
ABSORBENCY • HEAT RESISTANCE • WASHABILITY • NON-FELTING • NON-ITCHING
NO ODOR • NO KNOWN ALLERGIES • MOTH RESISTANCE • MILDEW RESISTANCE

Fiber Division • Virginia-Carolina Chemical Corporation • 500 Fifth Avenue, New York 36, N.Y.

For: Dyeing, Printing, Reducing, Stripping



REDUCING AGENT FOR VAT DYEING:

A pure, full strength Sodium Hydrosulfite ($Na_2S_2O_4$). A reducing agent for dyeing vat colors on cotton, rayon and other fabrics. Also HYDROSULFITE OF SODA Q.D. for immediate solubility in continuous vat dyeing machines.

APPLICATION & DISCHARGE PRINTING:

The highest strength of Sodium Formaldehyde Sulphoxylate. ($NaHSO_2.CH_2O.2H_2O$). For application printing of vat colors and for discharge printing on all textiles. Also used for stripping.

DISCHARGE PRINTING OF ACETATE:

A clear-dissolving, soluble Zinc Formaldehyde Sulphoxylate. ($Zn(HSO_2.CH_2O)_2$). For discharge printing on acetate dyed grounds. Also for stripping certain colors on wool, acetate and nylon.

STRIPPING WOOL STOCK:

This is a Basic Zinc Formaldehyde Sulphoxylate ($Zn(OH)HSO_2H.CHO$) used for stripping wool stock, Shoddy and rags.

DISCHARGE FOR INDIGO:

Mixture of Leucotrope W and Hydrosulfite AWC in the proper proportions to give a white disharge on Indigo-dyed grounds.

DISCHARGE FOR INDIGO:

Sulphonated quaternary base. For pure white discharges on Indigo-dyed grounds when mixed with Hydrosulfite AWC.

The Jacques Wolf Family of

Hydrosulfites

Write today for complete information as to how a Jacques Wolf Hydrosulfite can help you do your job better. Samples for testing sent without obligation.

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